PART I.

OF A

DESCRIPTIVE CATALOGUE

OF THE

LEPIDOPTEROUS INSECTS

CONTAINED IN THE

Museum of the Honourable East-India Company,

ILLUSTRATED BY

COLOURED FIGURES OF NEW SPECIES

AND OF THE

METAMORPHOSIS OF INDIAN LEPIDOPTERA,

WITH

INTRODUCTORY OBSERVATIONS

ON A

GENERAL ARRANGEMENT OF THIS ORDER OF INSECTS.

BY

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TO BE COMPLETED IN SIX PARTS.

London:

PUBLISHED BY PARBURY, ALLEN, & Co.

LEADENHALL STREET.

TO THE

HONOURABLE THE COURT OF DIRECTORS

OF THE

Honourable East-India Company,

THIS WORK

IS, WITH THEIR PERMISSION, RESPECTFULLY DEDICATED,

BY THEIR GRATEFUL AND

OBEDIENT SERVANT,

THE AUTHOR.

INTRODUCTION.

It is proposed, in the following work, to give "*a descriptive Catalogue*" of a series of Lepidopterous Insects, which form part of a general entomological collection from Java, contained in the Museum of the Honourable East-India Company. Of this collection, and of the circumstances under which it was formed, a concise account is offered to the public in the preface to the Annulosa Javanica. The details there given, which are accompanied with many pertinent remarks on the nature of descriptive Catalogues in general, would effectually supersede all further remarks on my part, were it not necessary, on this occasion, to point out clearly the relation of the present work to that undertaken, from the same materials, by the distinguished author of the *Horæ Entomologicæ*. My highly respected friend, William Sharp Macleay, Esq., having noticed with commendation that part of the collection which relates to the metamorphosis of the Javanese Lepidoptera, I feel myself called on to give in this place a more minute account of the nature of these materials, and to add to the details already given some further notices regarding the collection in general. I am likewise desirous to declare, immediately at the commencement, the views by which I propose to be guided in the present undertaking.

When the plan of the Annulosa Javanica was first communicated to the public, it was the intention of the Author to include in his work all the orders of insects; and although his labours were in the first instance directed to the Coleoptera alone, yet he announced, both in the notice originally circulated and in the title of the work, that they consisted in an attempt to illustrate the natural affinities and analogies of the insects observed in Java, without limitation to any particular branch of entomology. It is not necessary, in this place, to show the interest and importance of a work of so enlarged a scope, conducted by the author of the Horæ Entomologicæ; for these must strike every person engaged in similar pursuits, whatever may be his opinion regarding that work or the peculiar views which it exhibits: the interruption of this enterprize, therefore, would have been a subject of deepest regret, if it had not been accompanied with an event highly advantageous to the distinguished author. While the second number of the Annulosa Javanica was anxiously expected, the appointment of Mr. Macleay to the office of his Britannic Majesty's Commissioner of Arbitration at the Havana was announced to the public. The friends of Mr. Macleay, without exception, offered him their congratulations on an

an appointment, which enabled him to pursue a favourite science on a rich territory of immense extent, as yet but very imperfectly explored, and on his advancement to a station combining a liberal compensation of services with high respectability. Their sentiments, as far as regarded Mr. Macleay, were purely congratulatory, yet the disappointment occasioned by his removal, was to them, individually, a cause of unfeigned sorrow. They considered the beneficial effects of his past labours on natural history, and more immediately on zoology. A small association of members of the Linnean Society had been recently formed, for pursuing with more immediate purpose zoological inquiries. This association, established with the entire sanction of the parent Society, whose object embraces natural history in its whole extent, was under particular obligations to Mr. Macleay, and viewed his departure with peculiar solicitude. Its meetings, which had often been enlivened by a luminous exposition of his views and by his affable instructions, were to be deprived of this advantage. The opportunity of consulting his universal experience, in difficult and undetermined points of affinity and arrangement, not only in entomology but in zoology generally, was to be lost. But no individual belonging to this small association felt this privation more strongly, or was more immediately affected by the event, than the individual, whose province it now is to continue, a portion at least of the design which Mr. Macleay had proposed to himself. The expectation of seeing the result of my entomological labours in Java brought before the Public under the favourable circumstances above mentioned, and receiving the illustration of the comprehensive views of Mr. Macleay, had been an object of sincerest gratification; and the suspension, if not the entire interruption of his original design, had caused me proportionate concern. Several months elapsed before I was able to form any determinate resolution. At length I was roused from my reluctance to engage, in any manner, in a work, which had been commenced by Mr. Macleay with such distinguished ability, by the consideration of the necessity of bringing the result of my labours before the Public, however imperfectly I might accomplish it; and it is now my business to state explicitly, at the commencement, that the present undertaking, although compiled from the same materials, is not a continuation of the Annulosa Javanica; that it does not in any way interfere with the plan of Mr. Macleay, but forms a distinct work, in which I propose to give a Catalogue of the *Lepidopterous* Insects belonging to the entomological collection made by me in Java.

But although I have so distinctly declared that the present undertaking is not a continuation of the Annulosa Javanica, yet it will be conducted with a steady reference to that work and to the Horæ Entomologicæ. The plan of the former will be my constant guide, and the comprehensive views detailed in the latter will afford the means of regulating the arrangements suggested by the former, and of comparing

ing and correcting my mode of proceeding. Accordingly, my principal aim will be to discover the natural affinities, and to follow them in the arrangement. Wherever my materials are sufficiently extensive, I shall trace the series through its whole extent, and endeavour to show, that in this department also, the principle so clearly developed by Mr. Macleay is exemplified, in the succession or chain of affinities returning into themselves or forming circles. In the series which will thus be submitted to my close examination, I shall endeavour to discover and point out the typical forms which indicate the subdivisions and distinguish the groups. But as it may be expected that, in a local collection, many forms must be deficient, and the thread of affinities often interrupted, I shall carefully notice these interruptions, with the design of supplying them, as far as necessary, from other sources of information. The analogies existing between objects of distant or of neighbouring groups will also be pointed out, wherever they may have been satisfactorily developed.

Mr. Macleay announced the Annulosa Javanica with the remark, that his plan would be best understood by a perusal of the first number. I would make a similar remark, but under circumstances, and with sentiments widely differing from those of my respected friend. If some of the details which regard the metamorphosis of Javanese Lepidoptera should be found novel and interesting, the arrangement will perhaps be reviewed with severe criticism. But I would request that it be received, at least provisionally, with indulgence, until I may have been enabled to add the illustrations which will follow in the course of the work, and until it may have been submitted to a candid scrutiny, and to a careful comparison with the labours of others in the same department; especially with those of Cramer in the continuation by Stoll; those of Abbot published by Sir James Smith; those of Roesel, De Geer, Sepp, Hübner, and above all those of the "*Theresianer.*" It will, at the same time, be considered, that it is my lot to attempt an arrangement, in a great measure from my own materials, and under many disadvantages, as far as regards experience and means of reference. Much of the knowledge and experience I require must be acquired by study and comparison in the progress of the work. Mr. Macleay, on the contrary, brought to his undertaking a minute acquaintance with entomology, and a confirmed habit of investigation, the result of a calm examination of an extensive collection, and matured by a severe and protracted course of study and meditation. I have already expressed my opinion of the excellence of his views, and I shall have many opportunities of repeating it. I may, perhaps, with peculiar propriety exercise the privilege of applying them, as far as my materials may enable me, as it may naturally be considered to be a wish on my part, to make the catalogue of the Lepidoptera as conformable as possible to the more detailed description of the Coleoptera. But there are difficulties of a peculiar nature connected with such a design. A local collection, as above stated,

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will necessarily be deficient in many forms; and these deficiencies can be supplied by general experience only. In the series I am proceeding to examine and describe, it will occasionally occur that the affinities may not be apparent, that the typical forms may be deficient, or indeed that my endeavours to discover them may lead me into mistakes, from want of experience and more extensive means of reference than I possess. Such mistakes, however, I flatter myself, will be gradually developed and corrected in the progress of the work, in proportion as my acquaintance with the subject increases: I am persuaded, indeed, that they will be attributed to my own inexperience, or to my want of information on the subjects under discussion, rather than to any thing erroneous or defective in the principles developed by Mr. Macleay, with so much acuteness and force of reasoning, in the Horæ Entomologicæ; for I have no hesitation in declaring my opinion, that these principles not only give correctness to our views, but have a very powerful tendency to promote the interest and importance of the study of natural history. Their avowed object is to direct the mind to the plan of the creation or to the natural system. With the same object continually in view, it will be my endeavour to determine the disposition of the subjects submitted to my examination: and while I wish to exercise a spirit of candid and unprejudiced inquiry, I shall, at the same time, be ready to receive advice and to attend to instruction; and I shall more especially acknowledge, with due consideration, every candid and liberal remark that refers to the system, or to the order in which the subjects have been disposed.

In conformity with the intimation expressed above, I proceed to those details regarding the materials to be described in the following pages, which the favourable notice in the Preface to the Annulosa Javanica has in some measure made necessary. These materials consist, in the first place, of a regular series of nearly nine hundred species; and although not equally numerous in the different tribes, and by no means complete in any of them, yet I am inclined to hope, that in the aggregate they present a fair sample of the Lepidopterous productions of the island of Java. In the second place, these materials consist of a series of drawings, representing the metamorphosis of a considerable number of the species, accompanied with the perfect insects and chrysalides appertaining individually to the subjects delineated, and with details concerning their food, number, and season. The former was made at distant periods of time, and in very different parts of the island; the latter was procured, almost exclusively, in the two years immediately preceding the year of my departure from Java, when I was settled in a fixed residence in the interior.

Mr. Macleay has already noticed the occasion of my early attention to insects; and that I was, almost imperceptibly, led to the collection of these beautiful and interesting animals during my botanical excursions. My first collections were hastily made and imperfectly preserved: they were little more than preparatory attempts, which

which gradually led to skill in collecting, and to what is of greater importance in a tropical country, to experience in preserving. I was, at the commencement, in want of almost every convenience for the latter purpose. But these deficiencies were, in a great measure, compensated by the richness of the districts through which I travelled at this period; and my early excursions afforded me many subjects which, in subsequent periods, I sought in vain. I still observe, in the series arranged in the Honourable Company's Museum at the India House, rare and solitary specimens, which were obtained at the very commencement of my entomological career. This I may date from Surabaya, the capital of what is called the north-east coast of Java: and as this place will always be memorable to me in an entomological point of view, I record it in these introductory remarks with grateful reminiscence. From Surabaya I passed successively through the districts of Passuruwang, Malang, Lamadjang, Pugar, and Blambangan; districts which aggregately form the eastern extremity of Java. From the capital of the last-mentioned province, Banyuwangi, I made a short excursion to the island of Bali. The hills, mountains, and uncultivated plains of these extensive districts, contain inexhaustible entomological treasures; and I have frequently, in the latter periods of my research, regretted my want of leisure, skill, and facilities for collecting, at this period. During the present calm review of my early peregrinations through Java, my imagination frequently returns to these remote, and, at the period of my visit to them, happy districts, combining the grandest natural scenery with the most delightful retreats of rural tranquillity and comfort.

In the island of Madura, which extends parallel to the districts of Passuruwang and Blambangan, I continued my research; and here first observed several of the more splendid oriental Papiliones, among which the most remarkable were *P. Peranthus* and *P. Agamemnon*. But it is not my intention, on this occasion, to notice all the places in the eastern extremity of Java which were interesting and productive, in this point of view: several, however, may be recorded here with propriety, as they will occasionally be referred to in the descriptive parts of the work. Having terminated my researches in the neighbourhood of Surabaya, I gradually proceeded, in a western direction, to Samarang, the capital of the entire eastern portion of the island, denominated by the Dutch, Java's north coast, or simply Java, in contradistinction to Batavia. The geographical situation of Samarang is in the middle of the island, at an equal distance from the eastern and western extremity. The Prowotto hills, about twenty miles south of this capital, belong to the most important entomological stations. I devoted a large portion of the rainy season of 1809 to an examination of these hills, and increased both my botanical and entomological collections. I next proceeded to the southern coast of

central

central Java, and advantageously employed some months in the districts of Pajittan and Kalak, in which vegetation is luxuriant and insects proportionally abundant. I here added a considerable number both of Coleoptera and Lepidoptera to my collections. I returned by a northern route to the capital of Surakarta, the residence of the Susuhunan or emperor of Java, the first in importance of the native princes; and as I here found an opportunity for carrying on my pursuits with advantage, I formed a permanent residence.

Surakarta was, upon the whole, the most important station in my various researches into the natural history of Java; as, besides the facilities mentioned in the sequel, I here obtained, after the conquest of the island, the support and patronage of the Honourable East-India Company, by which I am also enabled, at this time, to bring the Catalogue of the Lepidopterous Insects before the Public. This capital is situated in an extensive plain in the middle of the island; and a concise description of it has already been given in the preface to the Annulosa Javanica. In selecting here a fixed residence, my objects were, in the first place, to have a secure dépôt for my collections, and secondly, to obtain the necessary facilities for visiting, from time to time, the various districts in the middle of Java, belonging to the native Princes, many of which were still almost entirely in a state of nature, and highly interesting in regard to their natural history.

During the year 1813 I was engaged in a visit to the island of Banka and the capital of Palembang, situated on the eastern coast of Sumatra. The mission, with which I was honoured, in conjunction with the Resident, and the account of my remarks which was required after my return, employed the greatest portion of that year and of 1814, in consequence of which my entomological pursuits were nearly suspended; but early in the year 1815 I resumed them with renewed energy. I had now acquired greater experience in collecting; a number of natives had been instructed for affording that assistance which in a hot climate was not only necessary, but greatly conduced to the enlargement of my investigations. I was amply provided with every convenience and facility for preserving what I had collected. Several draughtsmen had likewise been trained, under my superintendence, for botanical delineations, and the skill they acquired in those soon fitted them for the annulose department. I was, therefore, enabled to enter upon a history of the Metamorphosis of Javanese Lepidoptera: a design which had long engaged my anxious solicitude.

Although I did not, at this period, so fully conceive the paramount necessity of an acquaintance with the metamorphosis of Lepidoptera, towards the establishment of a natural arrangement, as I have been led to do in later periods, yet I was so strongly impressed with its essential importance in attempting a complete history of insects, that I commenced with a fixed determination to prosecute the inquiry with unremitted

ted industry and zeal, to collect all the larvæ of Lepidopterous insects which I might possibly obtain, and to trace them through the various periods of their existence. With this view, I fitted up a large apartment adjoining my residence with breeding-cages and receptacles for chrysalides. At the commencement of the rainy season, the period when in tropical climates the foliage of vegetables is renewed, I daily went out in search of caterpillars, accompanied by the most intelligent of my native assistants. The caterpillars thus collected were placed in separate breeding-cages, and several of the assistants were instructed to provide daily, at regular periods, the food the individuals required, and to secure the cleanliness of the cages. As soon as the caterpillars were approaching to perfection a drawing was made of them. The same individual which had been submitted to the draughtsman was then separately confined, watched with the most diligent care, and as soon as it had passed into the state of a chrysalis again made the object of the pencil. A determinate number was carefully attached to the drawing and to the cage of the chrysalis. As soon as the perfect insect had appeared and expanded its wings, it was secured, set, and numbered in accordance with the larva and chrysalis. During this period every possible solicitude was employed to prevent mistakes: the original series, consisting of the perfect insects and the chrysalides obtained by this mode of proceeding, and numbered in accordance with the collection of drawings made at the same time, is now deposited in the Museum of the Honourable East-India Company, and affords an authentic document of the accuracy of the details regarding the metamorphosis of Javanese Lepidoptera, which will be offered in the course of this work. During this process, the food, the date of appearance, the peculiarities as far as regards the abundance or scarcity of the species bred, were carefully recorded, with the intention of forming a regular "Raupen Calendar," according to the plan of Schwarz, as well as for the purpose of contributing to a general calendar of the Fauna and Flora of the island of Java. But I have in this place to regret the want of many details, which could only be supplied by a longer period of observation than was allotted to me.

The process thus described, afforded likewise the means of obtaining in great number perfect specimens of many of the Javanese Lepidoptera; and in this I had in view, not only the extent and beauty of the collection, but particularly the means of affording at a future period, by examination and dissection, a complete history of this order of insects as found in Java. The advantages of this plan will abundantly appear in the course of this work; for I hope to be enabled to illustrate many generic characters, in detail, from specimens possessing all their parts in a state of high perfection, and to contribute additional information on subjects, of which a very unsatisfactory account has hitherto been published. My plan, as before

before observed, embraced all the Lepidoptera of Java, particularly those of the central portions or the territory of the native Princes, and an essential part of it was to undertake, from time to time, journeys to the hills, mountains, and forests remote from the capital: during these excursions I was provided with breeding-cages, materials for collecting and preserving, and accompanied by my draughtsmen and native assistants. The excursions generally afforded new and interesting subjects: in many cases the larvæ and chrysalides were carried to my residence, and there brought to maturity at their regular periods. Having continued this mode of research for two seasons, my labours were unexpectedly terminated, by the transfer of Java to another European power. The disappointment which this occasioned at the moment, arose principally from considerations of the unfinished state of my research, and from the abridgment of my original design. Although supported, in later periods, by a large portion of public liberality and patronage, my progress had been very gradual, and had depended in the commencement, in a great measure, on my own exertions. By a steady adherence to the same object, I had provided an extensive establishment for prosecuting inquiries of natural history in its various branches, among which the facilities above described were not the least. I therefore regretted to have been obliged to abandon a pursuit which had been an object of my early solicitude, and which soon after its commencement had been postponed in consequence of the visit to Banka abovementioned. These remarks were deemed necessary in order to account for the limited state of the collection, since it by no means corresponds with the richness of the territory or the length of my residence in the eastern islands. What is now offered to the public is little more than a fragment of a more extensive undertaking, which was intended to assemble, as far as possible, a complete series of Javanese insects, and especially to exhibit a comprehensive view of the metamorphoses of the Lepidoptera of the island.

The sentiments of regret occasioned by the abrupt and unforeseen termination of my entomological pursuits, and the considerations arising from the unfinished state of my collections, were heightened by similar disappointments in my pursuits in botany and other branches of natural history, and my preparations for a departure, of which I am now to give a concise notice, were undertaken with many discouraging reflections. But a favourable series of events has in a great measure removed my former apprehensions: and although I notice at the present period, perhaps more forcibly, the unfinished state of my collections, and the deficiencies arising from their abrupt termination, yet the success in bringing the entire result of my inquiries into a place of safety, without any considerable loss or damage during the voyage, the favourable reception which I have met with in England, and the liberal patronage which has been afforded to my endeavours by the Honourable Court of Directors

Directors of the East-India Company, have alleviated a disappointment, which, under other circumstances, would have been peculiarly distressing and oppressive. After the second season devoted to observing and delineating the Javanese Lepidoptera, it became necessary to prepare my collections for transportation to England.

During the inquiries which I made in the early part of my residence in Java, to become acquainted with the best methods for securing what I obtained in my excursions, I noticed the plan described by Le Vaillant, in his travels in Africa, for the preservation of his entomological collections. It is the following: boxes or chests carefully made of light wood, of a convenient portable size, are provided with partitions or moveable shelves, each consisting of a simple board; these are fitted at the distance of two inches one from another, in grooves in the sides of the box, in which they are made to slide with accuracy and facility, and are therefore removable at pleasure. These boards or shelves have necessarily the exact dimensions of the ends of the chest, and arc placed in a vertical position: a small vacancy is preserved between their lower extremity and the floor, and any object detached by accident, falls to the bottom without causing further injury. Each board or shelf, lined with cork or soft wood, supplies in some measure the place of a cabinet drawer. When taken out of the box and placed on a table, it rests securely and affords a plane surface, upon which insects may be fixed or examined with perfect ease and security: it is returned into the box in an instant, which if carefully made, when closed, secures most effectually the contents. A small quantity of camphor, at the bottom, spreads its influence over the whole. One large box may conveniently contain fourteen boards, answering the purpose of as many drawers; and being eighteen inches square, they have a manageable size. This plan I resolved to adopt. In the early period of my pursuits, the boxes which I provided were made of light wood, and to their use I must ascribe, in a great measure, the preservation of my collections. I found that they afforded a complete protection against the ants and other destructive insects which abound in the Island of Java, perhaps as much as in any other tropical region. They were peculiarly useful in travelling, and possessed the advantage of affording a ready access and reference to the subjects. As the ultimate object of my pursuits was to provide an extensive and well-conditioned collection, which might be useful and instructive in England, I had, soon after receiving the patronage of the Honourable East-India Company, directed my attention to the provision necessary for its safety during a voyage. My residence at Surakarta afforded me peculiar advantages in this point of view. Both materials and workmen are here obtained, perhaps more readily than in any other part of Java. Boxes, according to the plan described, were therefore provided, of more substantial materials than those employed in travelling, in proportion to the

increase of the collection. The wood of the *Bombax pentandrum* was employed for lining the boards and securing the pins; and I ascribe to an acquaintance with the peculiar property of this wood, which renders it an effectual substitute for cork, the preservation of the collection during its transportation. After having carefully packed the subjects, every necessary precaution that suggested itself was used in securing the boxes against accidents during the voyage. They were individually painted and covered with oil-cloth. Each box was then placed in an outer case, made of the same substantial materials, and secured in the same manner. By these various precautions, and by the care which the collection received from the commander of the vessel during the voyage, I enjoy the satisfaction of having brought the whole in safety to England.

When I had formed the plan of undertaking the description of the Lepidopterous Insects from Java, contained in the Museum of the Honourable East-India Company, I was naturally led, by the preparatory pursuits of which I have now given a hasty sketch, to inquire, in how far an arrangement might be effected, which should be founded primarily on their metamorphosis. The remarks which occurred on this subject, in various parts of the Horæ Entomologicæ, tended to confirm and enlarge my early and imperfect notions. It would be foreign to my present purpose to follow Mr. Macleay in his copious details and remarks on this point, but on the whole, they have encouraged me to persevere in the attempt. Thus, for instance, in one place, he is led to "inquire into the possibility of being enabled to show that the most distinguished among naturalists have united in expressing their conviction, that considerations founded on metamorphosis must ultimately produce the most natural plan of entomological arrangement;" and to state, "that he thinks it may be inferred, from a sketch he proposes to give of some of the most remarkable truths in Natural History, that this proposition ought not to be deemed incapable of demonstration." Bearing in mind, therefore, this and similar remarks, I was anxious to ascertain what information had already been brought before the public regarding the metamorphosis of East-Indian Lepidoptera. My research, in this point of view, however, afforded me no satisfactory result. I found, indeed, in the work of Cramer, continued by Stoll, and in Abbot's Georgian Insects, published by Sir James Smith, delineations of the larvæ and chrysalides of many Lepidoptera of the tropical countries of the new world; but these were only useful for comparisons. Subjects exclusively Indian, which alone were calculated to afford that precise information which I was in search of, and which would likewise practically confirm the faithfulness and accuracy of my own observations, did not occur to my research. I was, therefore, I may say, almost necessarily restricted to my own materials and remarks, and I determined to attempt their arrangement according to the principles

above

above detailed, even though I should obtain no other assistance of the same nature. In forming this resolution, I likewise considered that the series of perfect insects which had been arranged in the Museum at the India-House, soon after my arrival in England, would be of considerable use in regulating my progress. As far as regards this series, I would observe in this place, that in its formation I had enjoyed the advice and co-operation of my friends, William Swainson, Esq., now residing at St. Albans, and of Mr. George Samouelle, of the British Museum. Indeed, a large portion of the first tribe had been arranged exclusively by the former gentleman. The attention which he had bestowed on this subject during a long period of years, his general acquaintance with the arrangements of others, and his correct views and general experience in entomological pursuits, afforded him advantages for such an undertaking which are seldom possessed by one individual: and I embrace with peculiar pleasure the opportunity now afforded me, of thus publicly acknowledging his assistance, and of expressing my personal obligations.

Having, therefore, a well-arranged collection of perfect insects before me, I commenced my work according to the principles above stated, by placing the larvæ and chrysalides, as far as I was able, in natural groups. It would, however, be foreign to my present purpose to enumerate the result of my first attempts, and the means by which I obtained, in my own opinion, more clear and correct views of the affinities of this order, as far as they appear in the first stages of metamorphosis. I may remark, however, with propriety, that these attempts laid the foundation for, and agreed essentially with, that plan of arrangement, which I propose to adopt in that great group, or tribe of this order which in the first part more immediately claims my attention. Having completed this preliminary arrangement of my own materials, I was naturally desirous of examining more in detail what had been done in the same department by others with similar materials, derived from different sources. This led to a circumstance which has had a decided influence on my whole undertaking. While I was prosecuting my inquiries on this subject at the Banksian Library, in the course of last summer, a book was incidentally mentioned in conversation, by a gentleman present,* which, I was informed, professed to be an attempt at an arrangement of Lepidoptera, according to their metamorphosis. The title of the book was new to me; as it had been published without the name of an author, it had escaped my research in my preparatory inquiries, and was not included in the list of books which I had noted for occasional reference, although it was contained in the library, and

* The author of the accurate and elegant Illustrations of the Genera of Insects found in Great Britain, &c., John Curtis, Esq. &c.

and was only hidden from my observation by its anonymous title. But I made a diligent inquiry for a work, agreeing apparently in design with the plan which I had formed for my own undertaking; and by the kindness of A. H. Haworth, Esq., of Chelsea, I was made acquainted with the SYSTEMATIC CATALOGUE OF THE LEPIDOPTERA FOUND IN THE NEIGHBOURHOOD OF VIENNA (*Systematisches Verzeichnis der Schmetterlinge der Wienergegend, herausgegeben von einigen Lehrern am k. k.*—THERESIANUM.) On further investigation I found that it was the production of the united labours of Messrs. Denis and Schieffermüller, two distinguished officers of high rank at the court of Vienna, who from their charge in the Imperial Academy, are known in Germany by the name of "THERESIANER," and their book by that of "DAS SYSTEM DER THERESIANER."

On opening this book, I made a discovery which filled me with inexpressible delight. Although the work was published more than half a century ago, I found, in the families into which the larger subdivisions are distributed, clear indications of almost all the genera that have been established in more recent periods, in the whole order of Lepidoptera. In the tribe of *Papilionidæ*, I observed the genera accurately determined and circumscribed, almost without a single modification, as they are now universally adopted; and, to illustrate this statement, I proceed at once to the following abstract of the families and species of the Linnæan genus *Papilio*, taken from the body of the work, *viz.*

Familia A. LARVÆ TORTRICIFORMES. *Papiliones Plebeji.—Urbicolæ*, L. Wiener Verzeichnis 159.

Species enumerated by Denis and Schieffermüller. Papilio Malvæ, L. P. Tages, L. P. Fritillum, Wien. Verz. P. Comma, L. P. Linea, *Müller.* P. Brontes, W. V. P. Steropes, W. V.

Fam. B. LARVÆ BOMBYCIFORMES. *Papiliones Heliconii*, L.* W. V., p. 160.

Species: P. Apollo, L. P. Mnemosyne, L.

Fam. C. LARVÆ VARIEGATÆ. *Papiliones Equites*, L. W. V., p. 161.

Species: P. Polyxena, W. V. P. Machaon, L. P. Podalirius, L.

Fam. D. LARVÆ MEDIOSTRIATÆ. *Papiliones Danai candidi*, L.

Species: P. Cratægi, L. P. Brassicæ, L. P. Rapæ, L. P. Napi, L. P. Sinapis, L. P. Daplidice, L. P. Cardamines, L.

Fam. E. LARVÆ PALLIDIVENTRES. *Papiliones Danai Flavi*, W. V., p. 164.

Species: Sect. 1. *Die Flügel ein wenig zugespitzt*, indicating the Genus Gonepteryx of Dr. Leach. P. Rhamni.

Sect. 2. *Die Flügel ganz rund mit schwarzem Auszenrande.* P. Palæno, L. P. Hyale, L.

Fam.

* As originally employed by Linnæus. By Gmelin, Fabricius, &c. this name is applied to a different group.

Fam. F. LARVÆ SUBFURCATÆ. *Papiliones Nymphales Gemmati,* L. W. V., p. 165.

Species: Sect. 1. *Mit vielen Aeugchen und stumpf gezähnten Flügeln.* P. Galathea, L. P. Aegeria, L. P. Megæra, L. P. Mæra, L. P. Dejanira, L. P. Ligea, L. P. Medea, W. V. P. Jurtina, L.

Sect. 2. *Mit vielen Aeugchen, aber ganz runden Flügeln.* P. Pyrrha, W. V. P. Medusa, W. V. P. Hyperanthus, L. P. Arcanius, L. P. Hero, L. P. Pamphilus, L. P. Manto, W. V.

Sect. 3. *Mit gezähnten Flügeln und wenigen Aeugchen.* P. Arethusa, W. V. P. Semele, L. P. Arachne, W. V. P. Phædra, L. P. Briseis, L. P. Alcyone, W. V. P. Hermione, L. P. Proserpina, W. V.

Fam. G. LARVÆ CORNUTÆ. *Papiliones Versicolores,* W. V., p. 170.

Species: P. Iris, L. P. Ilia, W. V. P. Jole, W. V.

Fam. H. LARVÆ SUBSPINOSÆ. *Papiliones Maculatofasciati,* W. V., p. 172.

Species: P. Populi, L. P. Sibylla, L. P. Camilla, W. V. P. Lucilla, W. V.

Fam. I. LARVÆ ACUTOSPINOSÆ. *Papiliones Angulati,* W. V., p. 174.

Species: Sect. 1. *Die Flügel fast nur gezähnt.* P. Atalanta, L. P. Cardui, L.

Sect. 2. *Die Flügel zackicht.* P. Io, L. P. Antiopa, L. P. Polychloros, L. P. Xanthomelas, W. V. P. Vau album, W. V. P. Urticæ, L. P. C Album, L.

Sect. 3. *Die Flügel ein wenig zugespitzt.* P. Prorsa, L. P. Levana, L.

Fam. K. LARVÆ COLLOSPINOSÆ. *Papiliones Nobiles,* L. W. V., p. 176.

Species: Sect. 1. *Mit Silberstreifen.* P. Pandora, W. V. P. Paphia, L.

Sect. 2. *Mit Silbermackeln.* P. Adippe, L. P. Aglaja, L. P. Niobe, L. P. Latonia, L. P. Euphrosyne, L. P. Pales, W. V. P. Dia, L. P. Daphne, W. V.

Fam. L. LARVÆ PSEUDOSPINOSÆ. *Papiliones Variegati,* W. V., p. 178.

Species: Sect. 1. *Die Unterseite der Hinterflügel mit drey weiszgelben und zwey oranien færbigen Querbændern.* P. Phoebe, W. V. P. Maturna, L. P. Cynthia, W. V. P. Hecate, W. V. P. Dictynna, W. V. P. Delia, W. V. P. Cinxia, L. P. Trivia, W. V.

Sect. 2. *Mit zwey gelblicht weiszen und drey braungelben Querbændern.* P. Lucina, L.

The remaining families are placed in a distinct subdivision, comprizing the *onisciform* (*vermiform* Nob.) *larvæ*; the *chenilles cloportes,* Reaum.

Fam. M. LARVÆ OBLONGOSCUTATÆ. *Papiliones Rutili,* W. V., p. 180.

Species: Sect. 1. *Die Mænnchen fast unbemackelt, die weibchen schwarz geflecket.* P. Virgaureæ, L. P. Hippothoe, L. P. Chryseis, W. V.

Sect. 2. *Beydes Geschlecht geflecket.* P. Helle, W. V. P. Phlæas, L. P. Xanthe, W. V. P. Circe, W. V.

Fam. N. LARVÆ GIBBOSCUTATÆ. *Papiliones Polyophthalmi,* W. V., p. 181.

Species: Sect. 1. *Die Unterseite der Unter Flügel graulicht ohne rothgelbes Querband.* P. Endymion, W. V. P. Daphnis, W. V. P. Arion, L. P. Alcon, W. V. P. Acis, W. V. P. Damon, W. V. P. Damætas, W. V. P. Argiolus, L. P. Alsus, W. V.

Sect.

Sect. 2. *Die Unterseite, besonders der Unter Flügel mit einem oranienfleckichten Querbande am Untenrande.* P. Corydon, *Scop.* P. Adonis, W. V. P. Alexis, W. V. P. Agestis, W. V. P. Argus, L. P. Aegon, W. V. P. Hylas, W. V. P. Battus, W. V. P. Amyntas, W. V.

Fam. O. Larvæ Depressoscutatæ. *Papiliones Subcaudati,* W. V., p. 185.

Species: P. Rubi, L. P. Betulæ, L. P. Quercus, L. P. Pruni, L. P. Spini, W. V.

After this detail of the families into which the authors of the Wiener Verzeichnis have divided the Linnæan genus *Papilio,* I add, in justice to them, the following quotation from page 196, which shews clearly that they considered these families as representatives of genera. " *Unsre familien werden vielleicht für das, was im Pflenzenreiche die Gattungen sind, schicklich gelten können.*" Our families will, perhaps, properly represent the same which the genera do in botany! Let us now examine how this remark applies to the genera which are (almost universally) admitted at the present period; I request the reader to refer to the families above enumerated.

Fam. A. represents the genus *Hesperia.* (See Ochsenh. Schmett. von Europa, vol. iv. p. 33.)

Fam. B. represents the genus *Doritis.* (See Ochsenh. Schmett. von Europa, ibid. p. 29.)

Fam. C. represents the genus *Papilio.* (See Ochsenh. Schmett. von Europa, ibid. p. 28.)

Fam. D. represents the genus *Pontia.* (See Ochsenh. Schmett. von Europa, ibid. p. 30.)

Fam. E. represents the genus *Colias,* and the first section indicates the genus *Gonepteryx* of Dr. Leach. (See Ochsenh. Schmett. von Europa, vol. iv. p. 31 and 32.)

Fam. F. represents the genus *Hipparchia,* and its various subdivisions. (See Ochsenh. Schmett. von Europa, vol. iv. p. 19, &c.)

Fam. G. represents the genus *Apatura.* (See Ochsenh. Schmett. von Europa, vol. iv. p. 19.)

Fam. H. represents the genus *Limenitis.* (See Ochsenh. Schmett. von Europa, vol. iv. p. 17.)

Fam. I. represents the genus *Vanessa.* (See Ochsenh. Schmett. von Europa, vol. iv. p. 16.)

Fam. K. represents the genus *Argynnis.* (See Ochsenh. Schmett. von Europa, vol. iv. p. 14.)

Fam. L. represents the genus *Melitæa.* (See Ochsenh. Schmett. von Europa, vol. iv. p. 13.)

The last section of this genus comprises the Melitæa Lucina of Ochsenh, the Papilio

Papilio Lucina of Linnæus mentioned above. The authors point out the distinctive properties of this species in a note;* they are of opinion, that it leads to the next family. Their opinion is founded on the character of the pupa; the larva had escaped their research. This species has afforded the type of a new genus Nemeobius to J. F. Stephens, Esq., who has thus confirmed the accuracy of the observation of Messrs. Denis and Schieffermüller.

The remaining families M. N. and O. embrace the Lepidoptera with onisciform larvæ; these constituted, according to the system of Fabricius, the genera Thecla and Lycæna. Mr. Stephens has lately, in his Illustrations of British Entomology, distributed them with more propriety into three genera, by which means,

Fam. M. represents the genus *Lycæna.*
Fam. N. represents the genus *Polyommatus,* and
Fam. O. represents the genus *Thecla.*

This abstract tends to show, in my opinion, that in the true Papilionidæ, at least, the metamorphosis affords most clear indications, not only of generic distinctions, but also of a continuous natural arrangement. To illustrate the *latter* of these points will, as has already been stated, be my object throughout the whole of the present undertaking. As far as regards the *former,* it is evident that those genera, which are now universally adopted, were clearly indicated as early as the year 1776; and the quotation above given proves that the authors considered their families as representatives of genera. They appear to have been prevented from imposing appropriate names, and from offering them to the public, by a deference to the authority of Linnæus, which at that time was paramount, and any interference with which was prohibited in them, apparently, by a sense of propriety, and by a modest reluctance to impede the general improvement in nomenclature, which had been just accomplished by that remarkable man. Denis and Schieffermüller, therefore, framed their system for the succeeding generation; and we shall see in the sequel how far their discoveries and suggestions were regarded. I shall, however, in this place merely advert in a general manner to the history of the nomenclature of the Papilionidæ. Now it is well known that most of the names of the genera above enumerated ware published in Illiger's Magazin der Insectenkunde, in 1807, as a fragment of a large work of Fabricius, a Systema Glossatarum, which was found in an unfinished state at the time of his death: for instance, the names *Melitæa, Argynnis,*

* ...... die letzte art (*Lucina*) unterscheidet sich wie man schon aus dem, was wir hier angesetzt haben, bemerken wird, noch deutlicher; vielleicht ist aber ihre Raupe mehr denen der drey folgenden Familien ähnlich: wenigstens sah ihre Pupe, die wir einst an eine niedere Wiesenpflanze angehæftet fanden, wie die derselben aus. W. V. p. 179, Note.

Argynnis, Vanessa, Limenitis, Apatura, Hipparchia, Lycæna, Thecla, Doritis, Pontia, Colias, &c. are derived from the Syst. Glossar. above-mentioned. But before this period the works of Schrank and Ochsenheimer had appeared, in which a considerable advance had been made towards those determinations which are almost exclusively ascribed to Fabricius: it will therefore be necessary, in the sequel, to give a more detailed abstract of some of the divisions of Ochsenheimer. The genera of Schrank are, on the whole, of a higher and more comprehensive description, and many of them are equal in rank to the stirpes of Mr. Macleay; but all his minor subdivisions are founded on the families of the Wiener Verzeichnis, which are uniformly referred to by him. I propose in the sequel to give an abstract of his subdivisions, and I shall have frequent occasion to quote his authority. Various other writers point out the estimation in which the Wiener Verzeichnis was held, especially in Germany, and the manner in which it was received on the continent of Europe: of these I shall here cite *Cramer, Borkhausen,* and *Illiger.*

Cramer's "*Papillons Exotiques*" was concluded soon after the publication of the Vienna Catalogue. In the introduction to the fourth volume we find the following passage: "Il seroit a souhaiter que l'on pourroit suivre dans l'ordre du rang des Papillons et des Phalênes exotiques et Européens, le Système des Entomologues de Vienne, un système qui, pour ce qui regarde celles à aîles farineuses de l'Europe, et principalement dans la Famille des Sphinx, est de la dernieure exactitude."

Borkhausen, who commenced in 1788, and continued in the succeeding years, a detailed description of the *Lepidoptera of Europe,* ascribes, in enumerating the writers on this order, the greatest merit to Denis and Schieffermüller. Among other commendations is the following: "not satisfied with an acquaintance with the insect in its perfect state, they examined it also in the early stages of its existence; they compared the various caterpillars with the butterflies which are produced from them, traced with indefatigable industry the plan of nature in these animals, and discovered the resemblance which was invariably preserved in the structure of species related to each other in affinity, in the different stages of their existence." He also points out their success in a natural disposition of subjects, in cases where the larva had not yet been discovered; and declares that experience had confirmed many combinations, established merely from the analogy of the perfect insect.

Illiger, in his preface to a new edition of the "*Vienna Catalogue,*" in which copious descriptions and synonyms are added to the species, while many original remarks of the first edition are omitted, declares that this work, at the time of its appearance, had formed an epoch in entomology; and that in 1801 it was still considered as one of the most acute and instructive works ever published on Natural History.

History. He further declares, that the high estimation it had originally acquired was not diminished, mentions the regard in which it was held by Fabricius, and the use he had made of it, and states, that notwithstanding the labours of Knoch, Hübner, Brahm, Borkhausen, and others, its contents might be considered at the present period a faithful epitome of our knowledge in this department of entomology.

But no writer has so completely entered into the spirit, and applied the views of the Vienna Catalogue, as *Ochsenheimer*, whose description of European Lepidoptera is perhaps the most comprehensive that has yet been offered to the public. To show this it would be necessary to analyse the whole, but such is not my present object; I shall only remark with regret, that in the latter portions of his system, he has in many cases departed from the families of the Wiener Verzeichnis, and has been led into unsuccessful combinations, and the establishment of various genera which cannot be approved; in the whole tribe of the Papilionidæ he has however most faithfully followed his guide; and the remarks contained in the preface to the first volume, in which he declares his opinion of this work in general, are so pertinent, that I shall extract them at large. " A complete and universal system of entomology, according to a common simple principle, is probably reserved for succeeding generations; in the mean time, it is the duty of the naturalist to seize whatever he may be able to contribute towards the history of separate parts, and by this means to facilitate future endeavours to complete the science. The authors of the Catalogue of Lepidoptera found in the neighbourhood of Vienna were not inattentive to this while they were framing a system, which indeed comprises only a large portion of the indigenous German Lepidoptera, but which, by the precision of the characters employed, by the number of subdivisions, and by the fortunate disposition of affinities, has obtained the reputation of the most acute and instructive work in this department of entomology, and the justest claims on the gratitude of the present and of succeeding generations. Considering the manifest insufficiency of single characters to distinguish the perfect insects from the species most nearly related to them, they recurred to the first stages of their existence, and by this means established a mark of distinction, which, although common to all, is yet diversified in all, and which affords the advantage of distinguishing with facility genera and species."

In giving, on this occasion, an abstract of several of the families of Ochsenheimer's system, I wish to direct attention to the period when the first part was published; and although it was in the same year in which the sixth volume of Illiger's Magazin der Insectenkunde appeared, it probably took place before the general promulgation of the posthumous Systema Glossatarum of Fabricius, above-mentioned.

 Ochsenheimer's

Ochsenheimer's *first* family is named SCHECKEN-FALTER, *Papiliones variegati;* SCHEINDORNRAUPEN, *Larvæ pseudospinosæ;* Schmetterlinge von Europa, vol. i. pp. 17 to 51.

This is precisely the character of Fam. L. of the Wien. Verz., p. 178: and of eleven European species enumerated by Ochsenheimer, seven are found here, *viz. P. Phœbe, Maturna, Cynthia. Dyctynna, Cinxia, Trivia, Lucina.* This family is now admitted as a genus with the Fabrician name of MELITÆA.

The *second* family is marked EDEL-FALTER, *Papiliones nobiles;* HALSDORNRAUPEN, *Larvæ collospinosæ;* Schmett. v. Eur. i., pp. 52—100.

This constitutes the Fam. K. of the Wien. Verz., p. 176: and of twenty European species enumerated by Ochsenheimer, ten are contained in this catalogue, *viz. P. Pandora, Paphia, Adippe, Aglaja, Niobe, Latonia, Euphrosyne, Pales, Dia,* and *Daphne.* This family is now distinguished as a genus with the Fabrician name of ARGYNNIS.

The *third* family is marked ECKFLUEGELIGE-FALTER, *Papiliones angulati;* SCHARF-DORNRAUPEN, *Larvæ acutospinosæ;* Schmett. v. Eur. i. pp. 101—134.

It agrees with the Fam. I. of the Wien Verz., p. 174: and of twelve European species enumerated by Ochsenheimer, eleven are contained in this catalogue, *viz. P. Atalanta, Cardui, Io, Antiopa, Polychloros, Xanthomelas, Vau album, Urticæ, C—Album, Prorsa, Levana.* This family now constitutes a genus with the Fabrician name of VANESSA.

The *fourth* family is named BANDIRTE-FALTER, *Papiliones fasciati;* HALBDORN-RAUPEN, *Larvæ subspinosæ;* Schmett. v. Eur. i., pp. 135—149.

It constitutes the Fam. H. of the Wien. Verz., p. 172: and of five European species enumerated by Ochsenheimer, four are found in this catalogue, *viz. P. Populi, Sybilla, Camilla, Lucilla.* This family is distinguished as a genus with the Fabrician name of LIMENITIS.

The enumeration of these four families is sufficient to show, that the families of Ochsenheimer and the genera of Fabricius, in this tribe, agree with the families of the Vienna Catalogue, and both may be considered as derived from them. The remaining families of Ochsenheimer's Papilionidæ may be traced to the same source, and the comparison will be found highly conducive towards obtaining distinct views of the early merits of this catalogue. In the work of Ochsenheimer, each of the families is preceded by a precise and well-defined descriptive character; he considered them indeed as genera, although he neglected the opportunity of imposing a name. In the preface we find the following passage. "It has long been wished, and it has also been attempted, to divide the numerous host of diurnal Lepidoptera into several genera; I therefore entertain the assurance of not venturing too much, when I consider, and treat as a genus, each of the families employed in the sequel." In the fourth volume, which contains a systematic arrangement of genera and species, these

these families appear with the generic names of Fabricius, with a few modifications of Ochsenheimer himself.

From the preceding details it appears that the catalogue of the Lepidoptera found near Vienna is held in high estimation in Germany; and that the system it contains has been adopted partially by Borkhausen and Illiger, and more generally by Schrank and Ochsenheimer. It is less known in France; but it is quoted with great distinction by M. Latreille; it has also been referred to in several instances by Mr. Haworth, in his Lepidoptera Britannica.

I consider an acquaintance with the Wiener Verzeichnis of the first importance in my present undertaking: the information which it contains, and the numerous instructive views which it affords, will greatly facilitate my progress; and its families, in most of the subdivisions, constructed exclusively according to the larvæ, will afford a constant standard for comparing my combinations, and correcting or confirming my views. But, independent of the merits of this work, as an abstract or epitome of almost all that has yet been observed regarding the metamorphosis of European Lepidoptera, it possesses excellencies of a higher order. Its decided object is the establishment of a natural arrangement; and, in this point of view, I consider it to have been, in the age when it was published, what the Horæ Entomologicæ are at present. There is a constant reference to the plan of the Creator in the structure of these animals. Whenever the authors indulge in any speculation, they display uncommon acuteness and depth of thought; and their unaffected modesty most advantageously sets off their learning and ability.

Having concisely stated the occasion of the present work, and in a very cursory manner described the materials from which it will be compiled, and the circumstances which influenced its commencement, I now proceed to some observations on the principles of arrangement and subdivision which will be adopted. I have already declared my intention of making the plan of the Annulosa Javanica my guide, and of adhering, as far as may be consistent with the plan and conduct of the present work, to the principles detailed in the Horæ Entomologicæ. In considering, therefore, the primary divisions of this order, I direct my attention, in the first place, to the former work, with this inquiry,—can the statement of Mr. Macleay regarding the division of the order of Coleoptera be applied to the Lepidoptera likewise? Making use, therefore, of his own words, I ask, "if we gradually limit our views, and descend from the consideration of the KINGDOM *Animalia* to the department or SUB-KINGDOM *Annulosa*, from this again to the CLASS *Haustellata*, and then to the ORDER *Lepidoptera*, thus leaving each group for one of its component minor groups, do we at length observe the last-mentioned, *viz.* the order Lepidoptera, to resolve itself into five minor groupes, or TRIBES?" Now it appears to me, that it

it will not be difficult for any entomologist, of very moderate experience, to refer most of the Lepidoptera with which he may be acquainted to one of the following types of form or divisions, *viz. Papilionidæ, Sphingidæ, Bombycidæ, Noctuadæ*, and *Phalænidæ.* To give a precise definition of these groups individually is not my design at present; perhaps it would not be a task very easily effected, according to their variations of metamorphosis. I propose that they be considered in this place abstractedly, without any regard to a rigid distinction, but as familiar types of form which may easily be called to mind. The designation of *tribe* will be applied to them individually, agreeably to the system of subdivision above enumerated. But it may, perhaps, be expected that I should give a comparative analysis of the divisions of this order, generally employed in systematic works; this will, however, be done with more propriety, as occasionally suggested, in the progress of the work: of the minor groups several will naturally find a place in the tribes above enumerated; the situations of others, according to their metamorphosis, require various comparisons and details, which I am not prepared at present to undertake.

I commence with some general remarks on the first tribe, the Papilionidæ, agreeably to the order of subdivision which I propose to follow; I shall then give a rapid preliminary sketch of the other tribes; after which I shall proceed to a more detailed analysis of the Papilionidæ, in which I shall consider the modifications of the metamorphosis in connexion with the structure of the perfect insect. Now I have to show, in the first place, that, in tracing the metamorphosis of the true Papilionidæ, which constitute the first tribe, and which comprizes the *Lepidoptera Diurna* of Latreille, the genus *Papilio* of Linnæus, the *Falter* or *Tagschmetterlinge* of Ochsenheimer and the authors of the Vienna Catalogue, I have observed several types of form, to which all the larvæ and chrysalides which I have collected myself, or which I have found described and delineated in the works of others, can without exception be referred, *viz.*

First: a *larva* of a linear oblong form, attenuated at both ends, depressed or cylindrico-convex, of a sluggish appearance, with short and scarcely perceptible feet; distinctly marked above with transverse striæ. A *pupa* nearly smooth, or with comparatively few protuberances, very obtuse at the anterior extremity, attached by the abdomen, braced, vertically suspended with the head upwards or tending forwards in a horizontal direction.

Examples of this larva are given in the third plate, in fig. 11, 12, and 13, and on the fourth plate both larva and pupa are figured in No. 1, 1. a. 2, 2. a. 3, 3. a. 4, 4. a. and 5, 5. a. The subjects represented will be referred to in the course of the work. This is apparently the most simple form in the tribe of Papilionidæ: it is distinguished in the diagram with the name of *vermiform.*

Secondly:

Secondly: a *larva* of a cylindrical form, generally swelled or thickened at the fourth or fifth section of the body, attenuated towards the head and posterior extremity; in the typical genera naked or covered with short, obtuse, fleshy protuberances; in the extreme genera, at the boundary of the neighbouring groups, covered with a close silky down or with short scattered hair, most remarkably distinguished by a furcula or forked tentaculum, situated between the head and neck, which may be drawn back or thrust forward at pleasure. *Pupa* angulated and mostly tuberculated; in the typical genera, and in those at the confines of the first group, attached by the posterior extremity, braced, and vertically suspended with the head upwards; in the genera approaching the third stirps perpendicularly suspended, according to the habits of that stirps. The caterpillar of this division is distinguished in the diagram as the *Chilognathiform* or *Juliform* type.

Examples: Plate iii, fig. 14, 15, 16, 17, 18, 19, 20. Plate iv, fig. 6, 7, 8, 9, 10, 11, 12, 13. By an oversight the pupa, both in this and in the former stirps, has been placed in a vertical attitude, which the reader is requested to bear in mind; the natural attitude is exemplified in plate iii, fig. 1, a. 2, a. 3, a. 4, a. and 5, a.; but in some instances the head is downwards; these will be pointed out in the descriptions.

Thirdly: a cylindrical larva, strikingly characterized by its terrific or threatening aspect, being covered with sharp, rigid, erect processes, often of great length, but diversified in the different subdivisions, arranged in regular longitudinal lines along the body of the larva, and beset with numerous diverging spines disposed in a verticillate manner. It is distinguished by the designation of *Chilopodiform* or *Scolopendriform larva.* The attitude of the *pupa* is the reverse of that of the typical forms in the two former divisions: it is attached by the abdomen, while the head is directed perpendicularly downwards: in form it is greatly diversified.

Three examples only of this form are given with a view to show its general habit, in plate iii, fig. 21, 22, and 23; the remaining modifications, which are numerous, will follow connectedly on succeeding plates.

Fourthly: a lengthened cylindrical striated larva, somewhat smaller at each end, apparently of an agile habit, naked, or covered with a slight down, having a head of moderate size, armed with two erect spines, or provided with a moveable shield, often of great size and beset with erect hornlike processes: but the chief characteristic of this division consists in two very strongly marked lengthened filiform or spinous appendages from the abdomen. The *pupa* is attached by the tail and suspended perpendicularly as in the last division; it is in general terminated by two points, of various form and length. The illustration of this division will be given with that of the former in the course of the work. One specimen only is figured on the diagram,

diagram, to afford a comparison with the others, and to illustrate the denomination of *Thysanuriform,* which has been assigned to it. See N. 24, Plate iii.

Fifthly: a cylindrical larva, nearly naked, with a very large head, often globular, and attached to the body by a long neck; characteristically distinguished from the other subdivision by its bluntness and abrupt termination behind: the metamorphosis resembles that of one of the divisions of the tribe of Phalænidæ, the *pupa* being covered by a convoluted leaf. Hence in the Vienna Catalogue the name of *tortriciformes* is assigned to the larva of family A of the third great subdivision, which comprises this form. In the diagram in the third plate are exhibited two forms of this larva; one of the Erycinidæ at the boundary of the fourth tribe, and one of the true Hesperidæ. In order to illustrate this preliminary sketch of the five types of form of the metamorphosis of the true Papilionidæ, I shall repeat the denominations which will be more fully explained hereafter: thus the first division, according to the larvæ, has been named *vermiform,* the second *juliform* or *chilognathiform,* the third *scolopendriform* or *chilopodiform,* the fourth *thysanuriform,* and the fifth *anopluriform.* These separate groups, agreeably to the plan of Mr. Macleay in the Annulosa Javanica, will in future be denominated *stirpes.*

In the tribe of *Sphingidæ,* I have distinguished the following types of form, which afford characters to the subdivisions or stirpes. As the entire metamorphosis will be detailed in the course of the work, I shall in this preliminary sketch give only a concise notice of the larvæ, without attempting their disposition in a natural order. We observe, then,

First: a vermiform larva, sluggish, somewhat hairy, with a small retractile head, and minute obscure feet. This larva, in the Wiener Verzeichnis, constitutes the Family G of the genus *Sphinx,* p. 44, &c. *Larvæ phalæniformes, Scheinspinnerraupen,* and the perfect insect the *Sphinges maculatæ, les Sphinx à cornes de belier.* Reaum. and Geoffr. It deviates more than the other stirpes from the regular type of the *sphingidæ,* and if the stirpes are arranged according to the principles of Mr. Macleay, it belongs to the aberrant groupes; but the determination of its affinity remains for a future investigation. Typical genus *Zygæna* of Fabricius.

Secondly: a cylindrical larva more slender and elongated than in the other stirpes; it is generally without lateral ocelli, and in one of the sections it is somewhat downy; the head is globular, and the abdominal horn short and rigid; the latter does not always exist, but in place of it is observed a specular mark. It comprises the families E and F of the Vienna Catalogue, p. 43 and 44. The former is characterized as having *larvæ elongatæ, Langleibraupen,* the latter *larvæ subpilosæ, Milchhaarraupen; Sphinges caudiberbes* and *hyalinæ.* The *Sesiæ* of Mr. Haworth, in his Lepidoptera Britannica, including both divisions, *tectæ* and *denudatæ,* constitute this stirps. The perfect insect

insect has short wings, and the abdomen is terminated by a broad or depressed brush-like appendage: in the latter group, Fam. F., the wings are transparent. The typical genera are *Macroglossum*, Scop., and *Sesia*, Latr.

Thirdly: a larva with a head almost triangular and acuminate above; the body obliquely striated, generally with yellow, naked and somewhat rugose: the abdominal horn of moderate size (smooth), generally marked with a peculiar colour. The perfect insect of this division is strikingly distinguished by its angulated or excavated wings. It constitutes the Fam. A of the Vienna Catalogue, p. 40 and 41. *Larvæ acrocephalæ*, *Spitzkopfraupen;* and the perfect insect the *Sphinges angulatæ*. Typical genus, *Smerinthus*.

Fourthly: a larva with an ovate truncated head, nearly naked and even on the surface; the abdominal horn lengthened, tuberculated, curved. The perfect insect has entire lanceolate wings; the abdomen is marked with oblique lateral striæ. It constitutes the Fam. B of the Vienna Catalogue, p. 41. *Larvæ amblocephalæ*, *Stumpfkopfraupen*, and the perfect insect the *Sphinges fasciatæ*. Typical genus *Acherontia:* species A, *Atropos*.

Fifthly: a larva with a small globose head, pale lateral spots on the sides of the body, or large ocelli behind the head, mostly with brilliant colours; abdominal horn generally simple. The pupa covers itself loosely with leaves. It comprises, as far as I have been able to determine, the Families C and D of the Vienna Catalogue, p. 42 and 43. In the former, *larvæ maculatæ*, *Fleckeraupen*, the perfect insects *Sphinges semifasciatæ*, have the abdomen marked anteriorly with abbreviated fasciæ; in the latter, *larvæ ophthalmicæ*, *Augenraupen*, the perfect insects, *Sphinges caudacutæ*, the abdomen is very acute. Typical genera, *Sphinx*, Ochsenh. (in part); *Deilephila*, Ochsenh. (in part).

These divisions do not embrace the genus Aegeria, and several other genera, commonly arranged among the *Sphingidæ:* which, if my observations are correct, have a different metamorphosis, and will probably, at least in part, find a place in the next tribe; but this remains for future discussion.

In the tribe of *Sphingidæ* the division is comparatively plain and obvious from various causes. The group itself is not very extensive, and being almost equally distributed through the temperate climes of Europe and through tropical countries, its metamorphosis is, comparatively, well understood. The divisions are therefore clearly determined, in the families of the Wiener Verzeichnis, and I have found them to apply so accurately to the results obtained with my own materials, that I have adopted them, with a few slight modifications which are obvious at first sight. But in the remaining *tribes* the metamorphosis is as yet not so perfectly known, at least in tropical countries: the divisions are moreover very extensive, the affinities very complicated,

plicated, and often obscure, and the reference to the perfect insect does not, in many cases, clearly illustrate the series. I shall therefore, at present, attempt no more than a preliminary enumeration of the most prominent types of form in the Javanese collection, illustrating them by a comparison with those families in the Vienna Catalogue which I have been enabled to determine with accuracy. But the whole, as above stated, is merely an imperfect preparatory outline; and in the enumeration of the groups, no arrangement according to natural succession is attempted. My object is to point out the prominent forms, with a view to their relative disposal, in the course of the work. I trust, however, when the groups shall have been analyzed in detail, to be enabled, in most cases, to point out clearly the typical forms, from a comparison of the metamorphosis with the perfect insect; and to dispose the stirpes in a continued series returning into itself.

The first form indicating one of the stirpes of the tribe Bombycidæ, I have denominated provisionally, after one of the families to be mentioned in the sequel, *Fasciculata*. I shall not attempt, in this place, a detailed description of its various modifications; this will follow more properly in the course of the work. Generally the larva is covered closely with silky hairs, *arranged in fascicles or tufts*, often of unequal length on different parts of the body, and always abruptly terminated. In some cases these tufts are beautifully variegated in colour. This stirps is naturally subdivided into two groups, one of which is exemplified in the genus Laria of Schrank (*Liparis* and *Orgya* of Ochsenheimer), the other in that of Arctia of Schrank, *Eyprepia* of Ochsenheimer. But this must be understood with some modification as to species. The families D, E, F, G, and H, of the Wiener Verzeichnis belong to this stirps. The family E more particularly corresponds with the genus *Arctia*: the designation according to the larva is Ursinæ (p. 52) Bærenraupen (hence the name *arctiæ*): "*Larva tuberculis in quolibet annulo decem, quæ plerumque pilis longis densisque obtecta sunt.*" Fam. G illustrates the genus *Laria*: larvæ Fasciculatæ (p. 54) Bürstenraupen. "*Larva fasciculis erectis scopiformibus nonnullisque insuper tuberculis pilisque brevioribus armata.*" This is more especially typical of the stirps.

Another stirps of the Bombycidæ has a larva, which may with propriety be denominated *Verticillata*. It consists of two principal divisions. In the first the typical genus is Saturnia of *Schrank*, *Ochsenh.*, &c. *Phalæna Attacus*, Linn.: in the second the genus Apoda of *Haworth*. The first comprises the Fam. B, *larvæ verticillatæ*, and probably also the Fam. C, *larvæ tuberosæ* of W. V., p. 49 and 50. *Larva in singulis annulis verrucis sex, pilis stellatim divergentibus.* Metamorphosis a terra remota, in folliculo pyriformi durissimo. The second comprises the Fam. U., W. V., p. 65. *Larvæ pedibus haud conspicuis* (Apoda Haw.): in Europæis limaciformibus, in Javanis spinis rigidis præditæ, quæ iterum spinulis verticillatis acutissimis instructæ sunt. Metamor-

Metamorphosis in folliculo ovato vel globoso duro. As an European example, I can only adduce the *Apoda Testudo*, Haw. Lep. Br. p. 137: in the Javanese collection are contained numerous species, which are considerably diversified, and of most of these the metamorphosis has been observed and delineated.

I place immediately after the stirps with verticillate larva another stirps, which I have denominated *Pilosa*: although I have not attempted a natural succession in this tribe, yet it appears to me that the structure of the folliculi or cocoons, with other particulars, indicates a relation of affinity between these two stirpes. The first typical genus may be considered to be LASIOCAMPA of Schrank: comprising part of the genus *Gastropacha* of Ochsenheimer; the genera *Odonestis* and *Eriogaster* of Germar, also belong to this stirps. I shall not at present attempt to define the relative limits of these genera; but I must remark that, in my opinion, Ochsenheimer deserves no commendation for deserting in the Lepidoptera Nocturna the plan of adhering to the system of the Vienna Catalogue, with which he commenced; and for declining to adopt several generic names of Schrank, which represent the structure of insects in the larva state, and among others *Lasiocampa*. Agreeably to this view he expressly states, vol. iii. Preface, p. vi.: "For this reason I left several names of Schrank, which were taken from the larvæ alone, unemployed." The families I, K, and L, of the W. V. belong to this stirps: Fam. I. p. 56, *Larvæ Collariæ*: Larva subhirsuta nucha incisura segmenti secundi et tertii cœrulea aut fulva. Fam. K. p. 56, *Larvæ villosæ*: Larva segmentis tomento tectis. Fam. L. p. 57, *Larvæ pilosæ*: Larva elongata, mollis, tota lanugine tenui tecta, omnibus strigarum fasciarumque coloribus pellucentibus. The latter may be considered as typical of the stirps.

A fourth stirps of Bombycidæ I have likewise named after one of the families of the Wiener Verzeichnis, *Lignivora*: it comprises the Fam. M, N, and O. In most of these the larva is naked, or has but few loosely scattered hairs, as appears from the characters of the families. Fam. M, *Larvæ Subpilosæ*, p. 59. Larva mollis (nigro variegata) nuda, punctis nigris solis fere pilis solitariis. Fam. N, *Larvæ Lignivoræ*: Larva levis pilis rarioribus, mandibulis validis: (in ligno putrescente victitat) p. 59. Fam. O, *Larvæ Radicivoræ*, p. 60: Larva nudiuscula, capite thoraceque nitidis (sub humo degit), metamorphosis intra terram in tela oblonga granis terreis commista). The typical genera are Pygæra, Cossus and Hepialus. The metamorphosis of the Fam. O. has some resemblance to that of the genera Psyche of Schrank and of Oiketicus of Guilding: and these appear to be allied to Hepialus, &c., but the determination of their proper situation in the circle of Bombycidæ remains for future discussion.

In the last stirps of this tribe which I shall enumerate, the larva is greatly

diver-

diversified in form; but there is one character which exists in all the varieties, from which it has been named *Cuspidata*: this consists in one or more points, or lengthened tubercles, either at the extremity of the abdomen or on one of the sections of the body. I have not ascertained whether all these various forms constitute a connected circle, but their analysis will follow in the course of the work. The typical genera are *Cerura* of Schrank and *Stauropus* of Germar, but the stirps also embraces *Notodonta*, at least in part, and *Aglia* and *Endromis* of Ochsenheimer, and the genus *Bombyx* as defined by Schrank.

The families R, S, and T, of the W. V., p. 62, 63, and 64, most properly named, according to the larva, *Gibbosæ*, *Furcatæ*, and *Cuspidatæ*, and part of Fam. A, *Larvæ Sphingiformes*, comprising the *Bombyx Mori*, belong to this stirps: the latter appears to be connected in affinity with the stirps first enumerated; but as it is not my intention to trace the circular disposition of this tribe at present, I have only transiently indicated several of the most obvious affinities.

The agreement between the forms of larvæ which I have discovered in Java, and those described in the Wiener Verzeichnis is so striking in the tribe of Bombycidæ, that I am induced to give in this place an enumeration of the families into which the section of *Bombyces* or *Spinner* has been divided, as they will illustrate most of the forms which will be described in the sequel. With one or two exceptions, the same forms of larvæ have, in this tribe, been observed in Europe and in Java. The names employed are so characteristic, that I have selected from them those which indicate the stirpes.

The families are the following, *viz.*

Fam. A. *Larvæ Sphingiformes*. Fam. B. LARVÆ VERTICILLATÆ. Fam. C. *Larvæ Tuberosæ*. Fam. D. *Larvæ Nodosæ*. Fam. E. *Larvæ Ursinæ*. Fam. F. *Larvæ Celeripedes*. Fam. G. LARVÆ FASCICULATÆ. Fam. H. *Larvæ Cristatæ*. Fam. I. *Larvæ Collariæ*. Fam. K. *Larvæ Villosæ*. Fam. L. LARVÆ PILOSÆ. Fam. M. *Larvæ Subpilosæ*. Fam. N. LARVÆ LIGNIVORÆ. Fam. O. *Larvæ Radicivoræ*. Fam. P. *Larvæ Noctuiformes*. Fam. Q. *Larvæ Geometriformes*. Fam. R. *Larvæ Gibbosæ*. Fam. S. *Larvæ Furcatæ*. Fam. T. LARVÆ CUSPIDATÆ. Fam. V. *Larvæ Limaciformes*.

They naturally resolve themselves, according to the views adopted in this work, into the following *Stirpes*, *viz.*

	Stirpes.	Familiæ Catalogi Viennensis.	Exempla Typica.
BOMBYCIDÆ.	Larvæ Fasciculatæ.	* D. G. H.	*Laria*, Schrank.
		** B. F.	*Arctia*, id.
	Larvæ Verticillatæ.	* B.	*Saturnia*, id.
		** U.	*Apoda*, Haworth.
	Larvæ Pilosæ.	I. K. L.	*Lasiocampa*, Schrank.
	Larvæ Lignivoræ.	M. N. O.	*Cossus*, Fabr.
			Hepialus, Schrank.
			Psyche, id.
			Oiketicus, Guilding.
	Larvæ Cuspidatæ.	* R. S. T.	*Cerura*, Schrank.
			Stauropus, Germar.
			Drepana, Schrank.
			Notodonta, Ochsenh.
	**	** A.	*Bombyx*, Schrank.

In the determination of these stirpes I have availed myself, next to my own materials, of the families of the Vienna Catalogue, and the arrangement of the Lepidoptera *Bombyciformia* made by Schrank in the second part of his Fauna Boïca. The genera here referred to have been established chiefly according to the larvæ. Several of them are of a very comprehensive nature, and will, in future, require subdivision: but the names can always with propriety be applied to the families or sections. They are judiciously chosen and highly descriptive, and should not unnecessarily be supplanted by others taken from the perfect insect, as has been done, in various cases, by Ochsenheimer.

In the two remaining tribes, the subdivisions which I am enabled to propose are still less determinate than in the Sphingidæ and Bombycidæ. I shall therefore, at present, give only a preliminary indication of the most prominent types of form, which I have observed in the Javanese series of metamorphosis; these I shall illustrate by a comparison with the families of the Vienna Catalogue: a more detailed analysis both of the metamorphosis and of the perfect insect is required for limiting the stirpes, and for indicating their relative disposition, according to the affinities of the subjects which compose them.

In the Noctuidæ, a term which I employ in a more extensive sense than is usually done, I shall exhibit, as the type of one of the stirpes, the following form: *a larva cylindrical, smooth and naked, always obtuse behind, with a termination either abrupt, or prominent and rounded.* In some of the minor subdivisions, there is, on one of the last segments of the body, an acute prominence with a broad base, in

in its disposition somewhat analogous to the horn of the Sphingidæ, but very different in form and appearance. The colours of this larva are generally green or brown; and in some of the subdivisions it is handsomely variegated: in all cases it is longitudinally striated, but the striæ vary in number and breadth: it is occasionally marked with a single broad longitudinal lateral band; the surface is almost in all cases dotted, and sometimes variegated with large distinct white spots. Several of the forms in our series agree so strikingly with the families of the Vienna Catalogue, that they deserve to be enumerated, as affording an illustration of the identity of this stirps in Europe, and in the tropical regions of Java, *viz.*

Fam. H. *Larvæ Tenuistriatæ,* p. 72, No. 42, 55, &c. *Javanese Metamorphoses;* typical genus Polia, *Hübn.*

Fam. M. *Larvæ Albilaterales,* p. 77, No. 30, 36, &c. *Jav. Met.;* typical genus Graphiphora, *Hübn.*

Fam. N. *Larvæ Terricolæ,* p. 79, No. 46, &c. *Jav. Met.;* typical genus Agrotis, *Hübn.*

Fam. O. *Larvæ Largostriatæ,* p. 81, &c. No. 62, 157, 13, &c. *Jav. Met.;* typical genus Mamestra, *Ochsenh.*

Fam. P. *Larvæ Obliquostriatæ,* p. 83, No. 150, &c. *Jav. Met.;* typical genus Hadena, *Schrank.*

The Fam. B, which with great propriety has been named Bombyciformis, because the larva resembles the verticillate stirps among the Bombycidæ, belongs also to this stirps, but not to the typical groups. The typical genus is *Acronicta;* and the peculiarity of the larva is noted by Mr. Curtis. It is also found in the Javanese series.

The distinguishing character of the larva of the next stirps of Noctuidæ which I shall enumerate, although without any regard to its affinity, *is its being attenuated almost equally towards both extremities,* and very slightly covered with a short down. The name of *Fusiformis* is therefore with propriety applied to one of its subdivisions, which constitutes the family C of the Noctuæ of the W. V. This family embraces several genera of the present systems; as *Lithosia,* at least in part, and *Eulepia* of Curtis, and *Deiopeia* of Stephens. I defer the analysis of its subdivisions to another occasion. I shall then endeavour to examine the somewhat extraordinary combinations of Schrank; if they are correct, many of the Tineæ will be here arranged. Schrank's genus *Setina,* comprises most of the species of the family with fusiform larvæ; and he unites in one family, which he denominates Lepidoptera Tineæformia, besides *Setina,* the genera *Nemapogon, Tinea, Setella, Harpella, Plutella,* and *Stigmella.* It remains to be ascertained whether these are indeed related by affinity, or whether he has been guided in this disposition merely by analogical relations. The habit of forming

forming a case which belongs to many Lepidoptera with fusiform larvæ, is likewise observed partially in other tribes of this order. Among the Papilionidæ it exhibits itself in the Hesperidæ; among the Bombycidæ in the stirps with lignivorous larvæ and in Psyche, and in the Phalænidæ, most evidently among the Tortrices.

The third stirps appears to be strictly oriental; at least I have not found any family agreeing with it in character in the Vienna Catalogue. *The larva is cylindrical, thinly scattered with short bristly hairs, abruptly terminated behind,* and, as far as I have observed, uniformly marked with *transverse* bands, of a brilliant, mostly yellow, colour. In its metamorphosis it resembles some of the Bombycidæ; the folliculus is irregularly hemispherical, and partially rests on the earth. The perfect insect is generally marked with strikingly diversified colours, in which black, yellow, red, and white, are contrasted. The antennæ are lengthened and slender; analogous to those of several Papilionidæ; they also indicate an affinity to the last stirps of this tribe. Numerous samples of this larva are contained in our series.

In another stirps the larva has a very decided character: it is still provided with sixteen feet, but of the eight abdominal feet *the two anterior are* by far the smallest; there is a swelling and discoloration about the fourth segment of the body, *and the last segment but one rises in a protuberance which is terminated by two points.* In walking, the larva partially resembles those of the Geometræ, and approaches in habit to the next stirps, but its attitudes are often more grotesque; the head is thrown back and the abdomen drawn inwards, so that it resembles a distorted letter S. Many of the larvæ resemble in colour the bark of wood. They are, in many instances, fringed along the sides of the body, hence the family name in the W.V. *Ciliatæ.* They are very numerous in Java, and exhibit several apparently uncommon modifications. The perfect insect is distinguished by the striking colours of the posterior wings, and by its habit of flying into houses at night. The Fam. X. *Larvæ Ciliatæ,* and Y. *Larvæ Pseudogeometræ,* pp. 90, 91, W.V., belong to this stirps, and the typical genera are Catocala of *Schrank,* and Abrostala of *Ochsenh.*

The fifth stirps is distinguished, in the larva state, *by having only twelve feet, and by bending the back in walking* in a greater degree than the fourth; hence the vulgar name of *half loopers.* Their metamorphosis resembles that of the typical stirps of the next tribe. The perfect insect is well known by the silvery or golden spots or marks on the upper wings. They are denominated *Noctuæ Metallicæ,* and constitute the family Z, W. V. p. 91, *Larvæ Semigeometræ.* The typical genus is Plusia of *Hübner.*

Of the stirpes enumerated, the first, provisionally named Nuda, from the complete nakedness of the larva in most divisions, is typical of the whole tribe. Schrank proposes the name of *Noctua,* by preference, for the Fam. M and N of the W. V. which

which belong to it: and two other families, O and P, he has united into the genus *Hadena*, which also belongs to the typical stirps. Another stirps is named Fusiformis; a third from the transverse disposition of the marks Fasciata; a fourth Ciliata, and the last Semigeometra.

It will appear more fully in the sequel that the families of the W. V. have, with scarcely a single exception, been likewise observed in Java.

The passage from the last stirps of the Noctuidæ to the first stirps of the Phalænidæ, is one of the most gradual which we have yet observed. The tendency to that character which so remarkably distinguishes the typical stirps of the fifth tribe, has been indicated in the stirps alluded to, the Semigeometræ of the last tribe. In the stirps which we are now considering, the habit of the larva is completely formed. It has, like the former, twelve feet, but its mode of undergoing the change approaches to that of the next stirps. It consists of the Fam. A of the *Geometræ* of the Vienna Catalogue, named (larvæ) *Seminoctuales.* It constitutes the genus *Phalæna,* as defined by Dr. Leach (Samouelle's Entom. Comp. p. 252); the second sect. of the genus *Phalæna* of Latreille; Genera, vol. iv. p. 227; and the genus *Ellopia* of Treitschke's Cont. of Ochsenh. Schm. von Eur., vol. v. 2, p. 429. As typical species, *P. margaritaria, prasinaria* and *fasciaria,* may be adduced. The family name of Seminoctuales may with propriety be applied to the stirps.

The second stirps is typical of this tribe, and exhibits one of the most remarkable groups in the whole order of Lepidoptera, whether we consider the perfect insect or the larvæ. *The latter have only ten feet: their movement in walking being compared to a loop, they are denominated loopers.* Ingressus tanquam si longitudinem spithameis metiaris. They exhibit various very striking modifications of attitude and appearance, according to which they are named in the Vienna Catalogue; and as these also occur in the Javanese series, I shall enumerate several as types of the subdivisions of this stirps, *viz.*

Fam. B, W. V. p. 69. *Larvæ Stoloniformes.* " Ad perpendiculum fere erecta quiescit." Gen. *Hipparchus,* Leach; *Geometra,* Treitschke.

Fam. C, W. V. p. 98. *Larvæ Corticinæ.* " Larva fere linearis, capite truncato in cortice per totum diem hærere solet." Gen. *Biston,* Leach; *Amphidasis,* Treitschke.

Fam. D, W. V. p. 100. *Larvæ Pedunculares.* " Larva præcedentibus gracilior, fere linearis." Gen. *Boarmia,* Treitschke.

Fam. E, W. V. p. 102. *Larvæ Surculiformes.* " Larva forma ramum seu surculum imitatur." Gen. *Aspitates,* Treitschke.

Fam. F, W. V. p. 103. *Larvæ Ramiformes.* " Larva tam colore et longitudine quam tuberculis, verrucis aut mucronibus ramulo simillima." Gen. *Geometra* and *Ourapteryx,* Leach; *Acæna* and *Ennomos,* Treitschke.

Fam. N, W. V. p. 114. *Larvæ Signatæ.* " Larva læte colorata." Gen. *Abraxas,* Leach; *Zerene,* Treitschke.

All

All these families, and several others which will be enumerated in their proper places, afford indications for generic distinctions, which are confirmed by the genera cited from Leach in Samouelle's Entomologist's Compendium.

I shall at present limit myself to a very general definition of the remaining stirpes of this tribe; their analysis will follow in the sequel, when I hope to be enabled to compare, in a more satisfactory manner, the result of the observations which I have personally made with those of Hübner and others, who have illustrated the metamorphosis of this order. I find, however, as well in my own materials as in the arrangement of the Wiener Verzeichnis, that the remaining groups of Phalænidæ are connected mutually one to the other, and to the two prominent groups already enumerated by very evident affinities. I shall, therefore, consider these as types of stirpes, and endeavour to show in the sequel that they complete the circle of Phalænidæ. Before indicating them, I shall extract a remark from the work just mentioned, as it not only illustrates the views entertained by the authors of these affinities, but also shows their constant endeavour to arrange their groups in a natural succession; to this they were led, by attending carefully to the metamorphosis of the insects. They place before the remark alluded to an apology for deviating in their arrangement from the order of Linnæus, who had separated the Pyralides from the Geometræ by the intervention of the Tortrices; they then proceed: "the reason which has induced us to make this alteration, is, that by this means we believe we have adhered more closely to the regular connexion and gradual passage which nature appears to have observed, and this both in regard of the caterpillars and the perfect insects." They then describe the larva of one of the groups, as far as they are acquainted with it, in the following words: "regarding the larva of the *Pyralides,* we remark that many of them want the first pair of the abdominal feet; they move, therefore, in some measure, after the manner of the Geometræ; they have uniformly a slender body, and they live uncovered on plants."*

According to this intimation, I shall consider the PYRALIDÆ as the group following immediately after the GEOMETRÆ, and representing one of the stirpes of the Phalænidæ, but without at present defining its limits. In the Vienna Catalogue they

* Wir setzen die *Zünsler* oder *Lichtmücken* vor den *Blattwicklern,* und glauben nicht, dass es jemanden leicht verwirren soll, obschon by Herrn Linnæus die letztern vor jenen stehen. Die Ursache, die uns zu dieser geringen Veränderung bewogen hat, ist, dass wir hiedurch den ordentlichen Zusammenhang, und sanften Uebergang, den die natur scheint beobachtet zu haben, mehr zu folgen glauben, und dieses sowohl in Betrachte der *Raupen* als der *Schmetterlinge.* Die Raupen belangend, so mangelt vielen von denen der *Lichtmücken* ein Paar der Bauchfüsze, sie gehen daher un wenig *Spannerformigt,* haben durchgehends einen schlanken Leib, und leben auf den Pflanzen ganz unbedeckt. W. V., p. 118.

they are divided into two families, one of which is represented by the genus *Herminia*, the other by *Botys*.

Following the same work, we are led by a natural succession to the *Blattwickler* or Tortrices, which I shall consider as the fourth stirps of Phalænidæ: this is a very extensive group, the character of which is indicated by the name. The larvæ in many cases are small, slender, mostly of a green colour, naked or slightly pilose, very active, and provided with sixteen feet. *They have the habit of contorting or rolling the leaves on which they feed, and in which they undergo metamorphosis.* This character will again be referred to in the sequel: many of the peculiarities of the larvæ remain for future investigation. The authors of the Vienna Catalogue express themselves very decidedly as to the natural affinity of the Tortrices to the groups, between which they are now placed. They all greatly resemble each other in their manner of undergoing their change, and no satisfactory characters for *subdivision* have as yet been proposed. The whole stirps is at present represented by a few genera, the limits of which are not defined.

The last group of the Phalænidæ, which is placed immediately after the Tortrices, constitutes "*die Schaben*," or Tineæ. They constitute one of the most diversified groups in the whole order. The caterpillars are generally small, and decrease to such a degree as to become almost imperceptible: *they have sixteen, fourteen, or even eight feet.* Their habits are also greatly diversified. No satisfactory subdivision has as yet been established. Schrank has united under his Lepidoptera Tineæformia as well *Lithosia*, *Eulepia*, and *Deiopeia*, &c. as the true *Tineæ* or Schaben: the former constitute the stirps with fusiform larvæ among the last tribe. In preliminarily indicating the fifth stirps of the Phalænidæ, the *Tineæ*, I shall adopt the views of the Vienna Catalogue. In referring to various modern systems, we find the Tineæform Lepidoptera separated and arranged into distinct subdivisions: the true limits of this group remain therefore for future determination. The affinity of many of the Tineæ to the Noctuidæ and Seminoctuales, will probably lead us to the point in which the circle of Phalænidæ is completed.

In reviewing this hasty sketch of the Phalænidæ, it appears that this tribe resolves itself into the following stirpes, *viz. Seminoctuales*, *Geometræ*, *Pyralidæ*, *Tortrices*, and *Tineæ*: the latter stirps, according to the views of Dennis and Schieffermüller, is again connected with the Seminoctuales. In the tribe, therefore, which we are now considering, the disposition of the stirpes according to their natural affinities has been comparatively easy, from the indications afforded by the authors cited; while in the second, third, and fourth tribes, my attempt extended no farther than to indicate the prominent forms or types, leaving the definition of the stirpes and their arrangement according to their natural relations to the progress of the

the work. Indeed my object in this preliminary sketch, has rather been to point out in a general manner at the commencement, the plan which I have projected for my arrangement, than to limit or define the groups permanently. I trust, however, that the confirmation afforded by the Wiener Verzeichnis to this first imperfect essay, will obtain for it an indulgent reception, until a more satisfactory elucidation can be afforded.

I have now traced the whole order of Lepidoptera in a rapid manner. I have attempted to show that it consists of five tribes, and that in the metamorphosis of each tribe, certain prominent or typical forms are manifested, indicating the subdivisions next in rank, which will be denominated, according to the plan of the Annulosa Javanica, *stirpes*. The gradual passage of one *tribe* into another, or the connexion of these higher groups by a natural affinity, has been only superficially stated; but it will be sufficiently apparent, I trust, that in the disposition of these tribes, I have attempted to follow the most gradual succession of nature; and I shall leave the proofs of this to the progress of the work itself. There is, however, one point regarding the connexion of the two principal tribes which presents itself for immediate notice. If the position above advanced be conformable to truth, we are now enabled to show with cogency, *that the whole order of Lepidoptera constitutes a series returning into itself.* The satisfactory illustration of this point will be given with greater advantages at the close of the work, when the subjects themselves shall have passed in review, and can be appealed to; and my present object will be chiefly to show the point of connexion between the tribe first mentioned and the last, in which the circle is completed. If we therefore return to the Papilionidæ, we find the stirps which recedes farthest from the typical character, to exhibit a decided tendency towards the nocturnal Lepidoptera, both in its perfect state and in its metamorphosis; this in both stages is indicated by their names, *viz. Hesperidæ* in the former, *Tortriciformes* in the latter. Nothing can more strongly prove this point than the following description of the different stages, from the Vienna Catalogue: Fam. A (Papilionum) *Larva Tortriciformis;* Larva nonnullis Phalænarum larvis persimilis; subnuda; antice posticeque tenuior (subfusiformis); capite globoso paululum fisso; *in foliis contextis habitare solet.* Metamorphosis *ad modum larvarum Tortricum,* in tela. Chrysalis similis phalænarum pupis. A similar approach to the nocturnal Lepidoptera is exhibited by the perfect insect of the Hesperidæ; the body is generally short and thick, the head large, the anterior wings when the insect is at rest expanded; the hinder tibiæ provided with *two* pair of spurs, one in the middle the other at the tip. They fly chiefly in the latter part of the day. Imago pedibus sex æqualibus; antennis brevibus; corpore plerumque brevi crasso, capite magno. Sedens alas, imprimis posticas, suberectas gerit. In all these particulars the Hesperidæ depart from the

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diurnal Lepidoptera. Now if we turn to the last tribe of this order, the Phalænidæ, we find again in the stirps farthest removed from the typical group, or from the Geometræ, a stirps agreeing in many particulars with the Hesperidæ. The individuals belonging to this group in the larva state, live in contorted or convoluted leaves; hence the name *Tortrices* is by preference applied to them. The perfect insect likewise resembles the Hesperidæ, and this not only in such characters as are common to all nocturnal Lepidoptera, but in several in which it deviates from them and approaches the Papilionidæ; of these I shall mention at present only the form of the antennæ, and the distribution of the marks on the wings. On this subject striking illustrations are afforded by several Javanese Papilionidæ, which will be given in the sequel; preparatory to which, I shall at present only refer to the figure of one of the insects on the second plate, fig. 1. genus *Petavia*, where the reader will find most of the characters of the *Tortrices*, *viz.* form of antennæ, additional spurs to the posterior tarsi, marking of the hinder wings, &c. in an insect, which Latreille, Cramer, and other writers have arranged among the diurnal Lepidoptera. A reference to Mr. Curtis's genera *Peronia* and *Sarrothripus*, will further illustrate this subject, which I shall pursue more at large in the analysis of the fifth tribe. But there are various points of affinity, of a more general nature, between the Papilionidæ and Phalænidæ. Both tribes are in a greater or less degree diurnal in their habits; while the Hesperidæ fly in the evening and many of the Phalænidæ at night, we find that some of the typical insects of the latter tribe fly in the day. The habit of carrying the wings erect when at rest, is likewise observed in several of the typical Phalænidæ, while in the Hesperidæ it is perfectly intermediate. Many individuals, more removed from the point of contact of the two tribes, indicate a partial approach either in their conformation or in their habits. Of these I shall mention in this place two remarkable South-American Lepidoptera, now arranged in the genus *Helicopis* of Fabricius, the *Papilio Cupido* and *P. Gnidus* of Linnæus.

I shall conclude this inquiry with some observations, which give me an opportunity to introduce the only subdivision of Lepidoptera of any extent, which has not yet been mentioned, and to adduce the confirmation afforded by the Wiener Verzeichnis of the view I entertain of the union of the Phalænidæ and Papiliones. It is the genus *Pterophorus* of Fabricius, the *Pterophores* of Geoffroi. Regarding this remarkable group, we find in the work just cited, p. 145, this observation: "We place the *Pterophores* (or *Geistchen*) with Linnæus, after the small nocturnal Lepidoptera; and here they form the passage to the Papiliones, according to our opinion, more properly than in the disposition made of them by M. Geoffroi, after the Papiliones and Sphinges, and before the Bombyces." This remarkable group, the true situation of which I shall not attempt to investigate at present, greatly resembles the diurnal Lepidoptera,

pidoptera, in various peculiarities of its metamorphosis. The larva is small, oblong, sluggish, broad, and slightly hairy, and evidently allied to that of the Vermiform stirps of the Papilionidæ: the change takes place without any cocoon, the pupa being suspended in the open air by means of two threads; the perfect insect is strikingly characterized by its plumiform wings, and long, slender, filiform antennæ. M. Reaumur coincides with the authors of the Vienna Catalogue, in placing this group between the diurnal and nocturnal Lepidoptera.

In the concise enumeration of the stirpes of the Papilionidæ, premised to the general view of the subdivisions of this order, their analogical relation to certain primary annulose forms was very generally indicated. It may be useful, therefore, to give some further details on this subject, to show its more immediate bearing on my present inquiry, and to apply the analogy which directed Mr. Macleay in the arrangement of the Coleoptera, in the same manner to Lepidopterous insects. With this view I refer the reader to the sketch contained on the third plate, in which the principal types of form of the larvæ of this tribe are disposed in groups, in the order in which Mr. Macleay has arranged the *Ametabola* in the Horæ Entomologicæ; vid. pp. 350 and 351; and I hope to be able to show hereafter, that the passage from one group to the other is perfectly natural, that the affinities in this stage of existence are continuous and uninterrupted, and that they constitute a series returning into itself. The confirmation afforded to this position by the analogy of the Ametabola, will be more fully developed in the course of the work; and a final test of its correctness will be supplied by the insect in its imago state. If it shall appear that an adherence to the succession of the forms of larvæ above described leads to a natural disposition of the subjects of this tribe in the perfect state, the principle of arrangement will be established on a firm basis.

Referring therefore to the diagram on the third plate, I request the attention of the reader in the first place to that type, which for reasons soon to be stated, and which indeed are obvious at first sight, I have denominated VERMIFORM. I desire him further to proceed in a direction to the left hand to the CHILOGNATHIFORM or JULIFORM type; this will lead him to the CHILOPODIFORM or SCOLOPENDRIFORM type; then changing his direction and turning again towards the right, he meets the THYSANURIFORM, and next to that, the ANOPLURIFORM type; and thus by a connected series he is brought back again to the Vermiform type with which he commenced. The forms of the larvæ themselves are familiar to all entomologists, who have paid any attention to the metamorphosis of this order, and examples of them may be seen in various entomological works, exhibiting Lepidoptera in their different stages of existence. Most of those which are represented on the sketch, have been taken as they occurred, partly from the Javanese Collection and partly from works of science,

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without being designedly selected for this purpose. The names defining the stirpes, as has already been stated, are the same which Mr. Macleay employs in the divisions of his class of *Ametabola*, and they follow the same order in which they occur in the Horæ Entomologicæ. (See p. 390, 392.) It is necessary, however, to state clearly, that these names, applied to the groups of the larvæ of the Papilionidæ, are merely indicative of *analogies*, or show that the larvæ possess certain analogous relations to the forms enumerated. This cannot be better illustrated, than by the following observation of Mr. Macleay; in giving the analogous characters of Coleopterous larvæ, (pp. 422 and 423 of Hor. Ent.) he says: " in terming larvæ *Chilognathiformes* or *Chilopodiformes*, it is not meant that they are *Scolopendræ* or *Iuli*, or even near to them in affinity, but only that *they are so constructed, that certain analogical circumstances attending them strongly remind us of these* AMETABOLA."

It may be proper, while considering this subject, to call the attention of the reader more particularly to the class of *Ametabola*, as defined by Mr. Macleay, with consummate ability, as it is one of the most remarkable groups in entomology, especially, in regard to its analogical relations to other groups. This class not only points out the natural order or succession of various minor subdivisions, but it represents many of the annulose forms, in their simple or elementary state. Thus, for instance, it exhibits the Coleoptera and Lepidoptera in the first stages of their existence. In illustration of this, I again refer to the Horæ Entomologicæ, p. 287, where, speaking of the Ametabola, the author remarks: " it is not absolutely meant that these animals do not undergo metamorphosis, but that, *constructed on the same plan with the larvæ of true insects*, they are rendered incapable by nature of completing their metamorphosis, and are able to perform the offices of adult life in all the various stages of an incomplete change of form." And then he proceeds to illustrate this remarkable arrangement of nature, by the following observation: " such a species of imperfection is not unique, nor confined to the Annulosa; for the Ametabola have their prototypes among the *Vertebrata* in the group *Amphibia*, where the genera *Siren* and *Proteus* are, to speak analogically, animals left imperfect in the first stage of metamorphosis." Now, although in comparing the larvæ of insects with the class of Ametabola, Mr. Macleay's remarks admit of an application to various orders, yet it is evident, that, in making the comparison alluded to, he had the larvæ of *Coleoptera* primarily in view, which indeed first directed his attention more particularly to the Ametabola.

Regarding the larvæ of Lepidoptera he expresses himself thus (p. 400): " If Lepidopterous larvæ sometimes imitate the more eccentric forms of the order of Chilognatha (alluding to the *Chenilles-Cloportes*, vermiform larvæ), *every one knows that their ordinary shape is that of an Iulus*." This indeed, as has been stated,

stated, is the typical form of the whole order. It will, however, appear from the figures of larvæ, contained on the third and fourth plates, and from the more full details which will be given in the sequel, that their analogy to the Ametabola, is much more clearly exemplified in the Lepidopterous than in the Coleopterous larvæ. The former are upon the whole much better known and more readily observed; and I trust their analogical relations will, on this account, be more satisfactorily elucidated. I make this remark with full deference to Mr. Macleay's superior merit, and with entire acknowledgment of his originality. It is very evident that I was led to the observation of these analogical resemblances by the study of his works, and the principle being once made known, its application and extension became comparatively easy. Mr. Macleay himself acknowledges some difficulties which presented themselves in completing the chain of these analogies, and particularly states his want of accurate information regarding the Thysanuriform larvæ. Of the fifth group, indeed, he says, p. 285: "I could form but little judgment, as the larvæ of it were but very imperfectly known."

It will appear, in the following pages, that numerous examples of all the types enumerated in the Papilionidæ have been observed in Java; and it will be my endeavour, as I proceed, to extend my examination to all the larvæ of this tribe, which have been described and published, in order to illustrate the position that *they can*, without exception, *be reduced to the five stirpes enumerated, which are constructed according to the plan of the orders of the Ametabola.*

I have endeavoured, in the diagram contained on the third plate, to illustrate by figures the order in which the stirpes succeed each other, and, finally, meet again and complete a circle. It is necessary, however, to bear in mind that this illustration is very partial and imperfect. It has not been possible, in the present attempt, to exhibit a great variety of forms, and to show the immediate connexion of the stirpes, although, in several instances, the passage from one to the other is clearly exemplified. My object has chiefly been, in the diagram, to show the maximum of the development of each type, while the remaining illustrations exhibit the gradual passage from one form to the other, which in most cases takes place, by an almost imperceptible variation. The diagram is intended to show those "typical eminences" on which, in the beautiful illustration of this subject afforded by Mr. Vigors, the character is most conspicuous, while the larvæ and chrysalides disposed in a linear series, exhibit the almost imperceptibly varying forms which lead along the "basal extremes" to the neighbouring groups.

As I propose to give a tabular view of the divisions of the tribe of Papilionidæ, agreeably to the principles now developed, I shall recapitulate and somewhat amplify the concise notices above given of the metamorphosis of this tribe, and

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add some details regarding the perfect insect. The first stirps in order has been denominated Vermiform, and if my views are correct, it is the most simple, both in the larva and imago state. In the circle of Ametabola, Mr. Macleay likewise considers the vermes, which consist of the *Epizoaria* of Lamark and the *Entozoa Nematoidea* of Rudolphi, as having the least complicated structure. The distinguishing characters of this stirps are an oblong body, attenuated at both ends, in some cases depressed or slightly convex, in others cylindrico-gibbous, appearing to consist of numerous scuta or shields, distinctly divided by transverse striæ, having a small retractile head, and very short scarcely perceptible feet, which are often concealed by the projecting scuta of the body. This form evidently indicates a strongly marked analogical resemblance to many of the *vermes;* but it is remarkable that the character of the osculant group, in the neighbouring circle of Crustacea, shows itself in many of these larvæ; this will suggest, in the progress of the work, some important observations on the analogical relations of the other tribes of this order. The genera among the Crustacea, in immediate contact with the Ametabola, are *Oniscus*, *Armadillo*, and *Asellus*. The resemblance of the larvæ of the vermiform stirps to these is indicated by their familiar names: *Onisciform larvæ*, *Chenilles-Cloportes*, *Asselförmige-Raupen*, &c. This larva occurs in Europe in the genera, *Polyommatus*, *Lycæna* and *Thecla*, or in the *Blues*, *Coppers* and *Hairstreaks* of our British nomenclature; and the three divisions of the Vermiform larvæ, which are established in the Wiener Verzeichnis, correspond with the groups indicated by these genera. They constitute the families M, N, O, of that work, named according to the modifications of the larvæ: *viz. Oblongoscutatæ*, *Gibboscutatæ*, and *Depressoscutatæ*.

I have observed in Java five varieties of the metamorphosis of this stirps, which belong to the genera above-mentioned, and indicate some modifications of the perfect insect; they will be referred to and described at large in the course of the work. They are represented in the order of their affinity on the fourth plate, in figures 1, 2, 3, 4, and 5. They are more diversified in their external appearance than the European larvæ of this stirps hitherto observed, and the corresponding modifications in the perfect insect will be the subject of future remarks. But many observations are still required to complete the deficiencies in the series. Of the subjects which are represented on the diagram, for the illustration of this stirps, fig. 11, is taken from Sepp, and belongs to the genus *Polyommatus*, as now defined; fig. 12 is from Abbot's Georgian insects, where it is named *Papilio Favonius;* (vol. i, p. 27, tab. xiv.) fig. 13 is from Esper, and belongs to the *Papilio Betulæ* of Linnæus; both the latter are now arranged in the genus *Thecla*. By the agreement of the metamorphosis of these insects, in the most distant parts of the world, in Europe, the Indian Archipelago, and North-America, the permanent character

character of this stirps is established. Many other confirmations may be found in the works of Sepp, Abbot, Roesel, Esper, Cramer, and Hübner.

The *pupa* of the Vermiform stirps, some of the peculiarities of which have already been mentioned above, is strikingly illustrated on the fourth plate, in fig. 1, a. 2, a. 3, a. 4, a. and 5, a. By an oversight in the arrangement of the plate, the subjects are given in a situation the reverse of that in which they are in general disposed. This the reader is required to correct. In their natural attitude the anal part is underneath, the head above. This pupa has upon the whole that attachment and mode of suspension, which characterises the typical stirps: it is fixed by the tail and secured in an erect attitude by a brace. Its chief peculiarities are an obtuseness of both ends, especially of the superior, and comparatively an even surface.

I have already remarked, that the *perfect insect* corresponds with the larva, as far as regards simplicity of form. In the Linnæan arrangement the group we are now considering forms the last of the divisions, and with the name of Plebeians of the lowest rank, *Plebeji rurales*, terminates the series of diurnal Lepidoptera. According to the observations of Mr. Jones, the structure of the wings, as far as regards the nervures, confirms the comparative simplicity of this stirps. But although diminutive in size, the Papilionidæ with Vermiform larvæ possess, in many cases, a beauty of form and an elegance of colouring which is not exceeded by any other insects of this order. Some of the exotic species of this stirps, belonging to the genera *Myrine*, *Helicopis*, and *Polyommatus*, are distinguished from the whole tribe, by the caudal extremities of their wings.

In enumerating some of the more characteristic pecularities of the perfect insect, I shall notice first the *palpi:* these are slender and of great length; the covering of scales or hairs on the basal aud intermediate joints is shorter and less in quantity than in the other stirpes; the third, or terminal joint, is directed forwards, comparatively of great length, and either naked or covered with minute scales. The genus *Myrine*, belonging to the typical group, exhibits the greatest length of palpi that I have observed in the whole tribe of Papilionidæ: they extend to the middle of the antennæ. On the second and fourth plate the general character of the palpi is exhibited; *viz.* Pl. ii, fig. 4, b. fig. 5, b. fig. 6, b. Pl. iv, fig. 1, b. fig. 2, b. fig. 5, b.

The *antennæ* in the typical genera are clavate; their form is regular, being small at the base, and gradually and uniformly thickened towards the extremity, which is either obtuse, rounded, or terminated by a bristle. This form is strikingly exhibited in the genus *Myrine*, and in the second section of the genus *Thecla:* see Pl. ii, fig. 5, c. fig. 6, c. Pl. iv, fig, 5, c. In the genera *Lycæna* and *Polyommatus* the antennæ are multiarticulate, filiform at the base and terminated by a cylindrical, compressed

compressed club, which is rather abruptly inflected or bent outwards. This form is exhibited in Pl. ii, fig. 4, c. Pl. iv, fig. 1, c. 2, c. and Pl. i, fig. 1, 2.

The *anterior wings* are generally regular along the posterior margin, which is either straight or slightly curved. The *posterior wings* are entire, dentated, or provided with one or more tails, the peculiar character of which consists in being slender and linear; in several genera the tails afford a very beautiful decoration.

The *feet* are slender, long, perfect in all parts, and alike in both sexes: the anterior feet are never spurious, and although in one section of the genus *Thecla*, they are somewhat shortened, yet all the parts are perfect. This partial abbreviation is observed in Fam. M. of W. V. *Larva oblongoscutata*, where the imago is described: "*pedibus duobus anticis aliquanto minoribus.*" The anterior feet are without any appendage, but the intermediate pair have on the thighs, in all genera as far as I have observed, a short acute process, about the middle. The *tarsi* are small. The peculiarities will be stated in the generic characters. The *body* is, on the whole, small, slender, and compressed; the *proboscis* either short or moderately elongated, and in general provided with erect bristles towards the extremity.

The second stirps, which from the character it exhibits in the first stage of its existence, is denominated Chilognathiform or Juliform, is the principal of the whole tribe, and the larva is typical of the whole order of Lepidoptera. This has already been stated in the general remarks on the analogical relations, between the metamorphosis of the Papilionidæ and the class of Ametabola, where it appeared that the Juliform habit of the larva of this order had already been pointed out in the Horæ Entomologicæ. I therefore proceed at once to the description. The larva of this stirps is generally characterized by smoothness of surface, cylindrical shape, and great length of body: but it presents the following modifications of form, in tracing which I shall commence at the confines of the Vermiform stirps; here we find it attenuated at both ends and transversely striated; an example is given in the third plate in fig. 14, belonging to the genus *Colias*, which, if my conclusions are correct, determines the natural situation of this genus. Hence we pass, assisted by various corresponding indications, in the other stages of the metamorphosis, to a regularly cylindrical larva, in which the transverse striæ are more obscure, and which is slightly hairy and marked with numerous small dots, uniformly disposed along the sides of the body. This group embraces the genera *Pieris*, *Pontia*, &c. In the typical groups, which follow next in order, the larva has a swelling or distension about the fourth or fifth segment of the body, from which it tapers more abruptly to the head, and in a gradual manner towards the anal extremity. This typical group consists of the true *Papiliones* as more rigorously defined and arranged in the genus *Papilio*, exhibiting, however, several modifications of form, which will be pointed out in the sequel as types for

for further subdivisions or subgenera. The modification of larva which follows in the series next to the typical group, presents a smooth surface, from which short, naked, fleshy, obtuse tubercles arise; as we proceed in the series towards the boundary of the Chilopodiform stirps, we find the tubercles increasing in length and produced to a point; the form first mentioned is exhibited in the third plate, fig. 17, and 17, a, and in the fourth plate, fig. 13, and 13, a; and it passes by very slow gradations to the second form, which in its larva state still preserves, in a great measure, the character of the Juliform larva, from which it is often distinguished with difficulty; but if we refer to the pupa and to the perfect insect, we find unequivocal indications of the next stirps. The subjects belonging to it afford, according to the comparisons which I have made, a very natural transition, which will be discussed at large in considering the Chilopodomorphous stirps. I shall, therefore, merely state, that it consists of the genera *Euplœa* and *Heliconia*: to show this I refer to the illustrations which I have attempted in the regular series of larvæ on the fourth plate, and in the diagram, preparatory to a future analysis, on the third plate. I shall, on the present occasion, point out the facts, and leave the inferences to the reader. The larva of *Euplœa* is represented only on the third plate, in figures 6, 7, 8, 9, 10; it is placed here in order to admit of a ready comparison with fig. 13 of plate iv, and fig. 17 of plate iii, belonging to the genus *Papilio*, and with figures 18, 19, 20, in the diagram. The latter belong to the genus *Heliconia*, and as I have not observed this family in Java, I have borrowed the illustration of the larvæ from the continuation of Cramer, by Stoll, where they are found on the first plate in figures 4, 5, 6; fig. 4 being *Heliconia Euterpe*, fig. 18 of our diagram, fig. 5, *Heliconia Amphione*, fig. 19 of our diagram, and fig. 6. *Heliconia Thalia*, fig. 20 of the diagram.

I may, on this occasion, point out to the reader an analogical resemblance, which, if correct, confirms the disposition of *Heliconia* in this part of the Lepidopterous circle; it regards the larva immediately following the true Papilionidæ in fig. 18 of the diagram; this appears to be analogous in habit to the genus *Craspedosoma* among the Ametabola, which genus stands between the *Chilognatha* and *Chilopoda*. (See Horæ Entom., p. 351). The *Heliconiæ* form an extensive group which, perhaps, is exclusively confined to the equinoctial parts of the New World; it is, in some measure, represented in India by *Euplœa* and *Idea*. The dissections of *Heliconia*, plate iii, fig. 29, a, b, c, d; of *Euplœa*, pl. iii, fig. 27, a, b, c, d; of *Idea*, pl. iii, fig. 28, a, b, c, d; and of *Acræa*, pl. iii, fig. 30, a, b, c, d; which latter, according to the form of the larva (fig. 21, pl. iii), is decidedly chilopodomorphous, afford a further illustration, and, I trust, a confirmation of this statement.

One remarkable character of the larva of this stirps remains to be mentioned, which affords an additional indication of the analogy to the Chilognatha among

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the Ametabola. This is a bifid fleshy organ or *furcula,* situated between the head and the first segment of the neck, which the caterpillar can protrude or retract at pleasure, and either employ as a means of defence or as an osmaterium. I have to regret that in the illustrations which I exhibit of the larvæ of Javanese Papiliones, this character is not always expressed in its full development; while submitted to the draughtsman this organ was naturally retracted, but there is sufficient evidence of its existence in the individuals represented, and in fig. 13 of pl. iv, it is partially protruded. In a figure, borrowed from Abbot, it appears in a state of complete development. The analogy afforded by this organ to the Chilognatha is not obscure, and will be more particularly referred to in the sequel. Another peculiarity of the larva of the typical genera of this stirps, is the manner in which the head is attached to the body: it is by the intervention of a very small articulation, so that the head, when exserted, appears separated from the body. This peculiarity is introduced by Ochsenheimer into the general character of the *Papiliones;* ; it is indicated by the authors of the Vienna Catalogue in the following words: " *Die Raupen haben den kugelichten Kopf merklicher vom Leibe abgesondert.*" See p. 158.

The *pupa* or *chrysalis* of the Chilognathiform stirps, agrees in its attachment and mode of suspension with that of the Vermiform stirps, but it has some peculiarities which indicate a greater perfection. The caudal extremity is firmly attached by a few threads or by a silky filamentose texture, which sometimes resembles a cord; (See fig. 13, a, pl. iv), while the anterior end is either free and detached, or leans slightly against some support, (a wall, a tree, &c.), in a perpendicular attitude, the thorax directed upwards; or it stretches forward nearly horizontally, being in both cases fastened and supported by means of a thread passing as a brace across the thorax. It is naked and angulated, but much diversified on the surface; the tubercles, always regularly disposed, vary according to the species; it is terminated, in the typical forms, at the upper extremity, by two processes; those species, however, which are at the confines of the Vermiform stirps, have only one short process, more or less acute: as the series approaches the Chilopodomorphous stirps, we find the same mode of suspension which prevails in that group; the chrysalis is attached by the tail, while the thorax is directed downward. An example of this is given in the fourth plate, fig. 13, a. Here the pupa has a perpendicular direction; but a fastening or brace still exists, by which it may, in some instances, preserve a partially horizontal attitude.

The imago or perfect insect of this stirps exhibits in the typical group the most perfect production of the whole order. The beauty of many of the large *Papiliones* is a subject of universal admiration: several of them are unrivalled in form and colouring. The stirps, as limited by the larva, embraces several of the first divisions made by Linnæus in the genus *Papilio*: the *Equites* and *Danaï,* and the *Heliconii* stand

stand at the immediate confines in the next stirps. The former, which have also been named *Nobiles*, were divided into *Equites Troes*, and *Achivi*. But these divisions rest entirely on artificial characters: it will appear in the sequel, that the variations in the form of the larva, afford indications for subdivisions; and they will eventually supply a test of the accuracy of the principles followed: my observations, however, are as yet very insufficient. The view which is given of the wings of Lepidoptera, by Mr. Jones, in the Linnean Transactions, vol. ii., p. 63, &c., in which the nervures are displayed, tends to confirm the perfection of the genus *Papilio*. No general description can be given of the form of the *wings*, which would apply characteristically to the whole stirps. In *Colias* and *Pieris* the anterior wings are upon the whole triangular, and the posterior wings short and obtuse: in the typical group the anterior wings have generally a slight curve in the exterior margin, which renders them somewhat falcate, and the posterior wings are lengthened and provided with tails, which are generally spatulate or contracted at the base.

The *palpi*, which in the Vermiform stirps are long, slender, naked, and projecting, have in this stirps a very different character. In the typical group they are shorter than the head, closely applied and concealed, by a very dense covering of long bristly hairs. The third joint is very minute, and, in the genus *Papilio*, the palpi are never exserted. In *Colias*, the situation of which, in the series, according to the metamorphosis is at the confines of the Vermiform stirps, these organs possess a moderate length; but in *Terias* an evident diminution is apparent, and in the following genera the decrease is more sudden. The Javanese series does not, however, afford the means of tracing the gradual change of form from *Myrina* to *Colias*, where these organs are most developed. The *Polyommatus Phædrus* of Latreille, a well-known Indian insect, which is also contained in the Javanese Collection, possesses a character intermediate between *Myrina*, of the Vermiform, and *Colias* of the Chilognathiform stirps; it appears to supply a natural connecting link. In the genus *Terias*, which follows immediately after *Colias*, the basal and middle joints are short, thick, and closely covered with scales, the terminal joint is minute, naked, and slightly projecting. The character of the palpi of the typical group is exhibited in various figures on the fourth plate; the articulations here are short, compact, closely beset with long hairs, while the last joint is not perceptible. The lateral view of the perfect insects, given on the first plate, tends likewise to show the comparative length, the position and attachment of the palpi in several genera. The minute distinctions will be pointed out in the generic characters.

The *antennæ*, in the typical group, have that form, from which Linnæus constructed the character of the genus *Papilio*. They are multiarticulate and marked with defined rings at the joints, elongate, filiform at the base, thicker towards the extremity

extremity, which in the typical group consists of a cylindrical club attenuated at both ends. The subdivisions of the stirps exhibit, however, several variations of form according to their situation in the series. In *Colias* these organs are filiform at the base and gradually and uniformly thicker towards the extremity, indicating in this particular, an approach to the Vermiform stirps. In *Pieris* the club is more suddenly swelled towards the extremity, which is compressed. In the true *Papiliones* the Javanese collection exhibits the following varieties: 1st.—antennæ with nearly uniform articulations, marked with distinct, prominent, annuli or rings; plate iv, fig. 11, c; 2d.—antennæ with an oval compressed club, in which the annuli are closely arranged or crowded; plate iv, fig. 12, c; 3d.—antennæ with uniform lengthened articulations and more obscure annular swellings; plate iv, fig. 13, c. The variations of form in the metamorphosis, corresponding to these characters, will be pointed out in the descriptive part.

The *feet* in this stirps, are generally long and robust; all three pair are perfect and fitted for walking; in the insects which constitute the typical species, the anterior tibiæ have near the middle a spine or short acute process, which is either naked or partially concealed by hair. The first *tarsus* is on all the feet of great length, and the *claws* are long, slender, naked, and in the typical group, exserted; in the subdivisions which approach the confines of the neighbouring stirpes, the claws present various peculiarities.

In *Colias* the anterior feet are comparatively slender, but they are complete in all parts. The posterior tibiæ have a single pair of spines only at their union with the tarsi; which character is common to all the stirpes of the first tribe, excepting the Anopluriform. The *abdomen* is generally cylindrical, of considerable length and attenuated at the extremity, but it is subject to several modifications of form; in one of the subdivisions it is provided with a hook at the extremity. In the female the abdomen is generally ovate and contracted near its union with the thorax. The *proboscis* in the typical species is very long and robust. The *eyes* are comparatively large and prominent.

I proceed to the Chilopodiform or Scolopendriform stirps, restricting my remarks at present to the notices required for the illustration of a general synoptic table of the true *Papilionidæ*, which is given in the sequel. In describing the Chilognathiform stirps I have already pointed out the characters in the genera *Heliconia* and *Euplœa*, which, in their larva state, retain a striking affinity to this stirps. I therefore consider these genera as forming a natural transition from the Chilognathiform to the Chilopodiform larvæ. The genus *Acræa* was originally arranged in our cabinet after *Euplœa* and *Idea*, from considerations of the perfect insect; this arrangement is now confirmed by the character of the larva, and in proof of it, I refer the reader to

to the diagram; he will observe that the larva of *Acræa* naturally finds a place between that of *Heliconia* and that of the typical *Chilopodomorphous* larva; Plate iii diagram, fig. 21. The appendages arising from the body of the larva, which, in *Euplœa* and *Heliconia*, were only simple and fleshy, are in the typical groups of this stirps rigid and armed with transverse spines; and the threatening or terrific appearance, which is the distinguishing feature of this stirps, is now completely established. It is this peculiarity which naturally and strongly reminds us of the *Chilopoda* or *Scolopendræ;* to which, among the Ametabola, they are related in analogy. It may likewise be observed in this place, that these larva resemble the Scolopendræ in the effects they produce, when their spines are accidentally touched: as in many instances they cause an irritation or swelling, analogous to that which follows the bite of a Centipede. The genera, in which this character exists, have already been enumerated, as defined by the families of the Wiener Verzeichnis, the names here applied are highly appropriate, and correspond with the gradual increase of the peculiar character of this stirps. Thus the family L, *Larva Pseudospinosa,* consisting of the genus *Melitæa,* has the spinose character in a comparatively small degree; in family K, *Collospinosa,* it is already more strongly marked, and from this we gradually pass to the family I, in which the development of the spines is at its maximum, and which has been denominated *Acutospinosa;* it comprises the genus *Vanessa,* which must be considered as the most perfect of the Chilopodiform stirps. This genus contains some of the most beautiful Papiliones which are found in Europe, *viz. Vanessæ Io, Antiopa, Urticæ, Atalanta;* and many of the foreign species are of exquisite form and beauty. The importance of this natural group was clearly observed by Schrank, who from the character of the larva, constituted it a distinct genus, with the name of *Dornfalter* (or thorn-butterfly); long before the promulgation of the Systema Glossatarum of Fabricius, and the genera of Latreille. He has applied to it by pre-eminence, the name of *Papilio,* thereby corroborating the position to be stated in the sequel, and which is also confirmed by the analogy of the Ametabola, that the Chilopodomorphous is one of the typical stirpes of this tribe. It likewise confirms the true character of the Chilopodomorphous stirps, which, in its larva state is most clearly distinguished from the next or Thysanuriform stirps; and attention to this statement is necessary, because, from considerations of the perfect insect alone, these two stirpes have been united in one genus or family, by most entomologists: whereas the character of the larva, as exhibited in the typical subdivisions, points out an essential difference.

The union of the two stirpes is effected by several genera which have an intermediate character, One of these is *Limenitis:* it constitutes the family H of the Vienna Catalogue. The typical character here gradually decreases in the larva state,

these are not concealed as in the Papiliones, but project beyond the head: the third joint distinctly appears, not naked as in the Vermiform stirps, but closely covered with down. The basal and the second joints are generally broad and robust; they are covered with hair on all sides and are likewise beset underneath with long straggling bristles, which give them that peculiar roughness, which in these organs is characteristic of the stirps. In the typical species the third joints converge or are bent towards each other, from each side, forming, in the language of Latreille a rostellum. Near the extremity of the second joint, stands, in most cases, a tuft of lengthened hair, which gives the extremity of the palpi, in a lateral view, a forked appearance. This character exists in different degrees of development, in the subdivisions of the stirps. I refer for illustration of it provisionally to the 96th plate of Curtis's British Entomology, until the dissections shall have been given in the progress of this work.

The *antennæ* of this stirps are of moderate length and filiform at the base, with a club rising abruptly, near the extremity, which, in the typical species is broad and compressed. In *Argynnis* it is nearly orbiculate, and has been compared with a target or shield. In the sub-divisions which recede from the typical groups and approach to the fourth stirps, the club, although still terminal, is very gradually capitate or swelled.

The gradual change of character which takes place in the metamorphosis of the second stirps as it approaches the confines of the third, has already been indicated: the transition is confirmed by the structure of the *anterior feet*. Several of the subjects which have been enumerated as situated near the union of the two stirpes, have an intermediate character, which is illustrated on the third plate: I refer to fig. 29, d, and 28, d, the former exhibiting the anterior feet of *Heliconia*, the latter of *Idea*. In both, these organs are abbreviated towards the extremity: the tarsi are not distinguishable into five joints, but are united, and their situation is indicated by several spines which are crowded together. But on entering the stirps fully, we find the anterior feet, in both sexes, constructed on a different plan. They are not, as in *Colias*, and in several genera of the Vermiform stirps, partially reduced in size; but they are *spurious* and *imperfect*. Both the femur and the tibia are of slender dimensions, and the tarsus consists of a single member, which in the typical genera possesses neither joints nor claws: they are moreover very hairy, and have been compared to a tippet. Latreille, in his general remarks on this order, describes them thus: *Pedes antici* submutici, interdum hirsutissimi, inflexi, pectori adpressi, inde *spurii*. The intermediate and posterior feet, in the typical group, are terminated by claws and pulvilli with membranaceous pubescent bifid appendages at their base. See Curtis's Br. Entom., plate 96.

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The *abdomen* is long, slender, and compressed, in the section which connects this and the second stirps; it is somewhat shorter in the typical species, and more robust, and suddenly attenuated near the confines of the fourth stirps. The *proboscis* is generally long and robust.

Thysanuriform Stirps. The characteristic mark of the larva of this stirps is an appendage to the posterior part of the body, consisting of two rigid setæ or spines, pointing directly backward. These setæ vary, indeed, in length and size, but their existence, in the individuals of the stirps, is general and without exception. This appendage has also been denominated a bifid tail or a furcula, from its forked appearance in many cases; it is more developed in some subjects than in others; it likewise varies in its consistence, colour, and mode of attachment. In some cases these spines or setæ are an immediate continuation of the substance of the larva, in others they differ in colour and texture, and the union to the body is by an articulation. This larva is peculiarly abundant in temperate regions; it unites, in the European Fauna, more species in one group than any other form of larva. This will appear by reference to the Wiener Verzeichnis, where the family named from the larva *Subfurcata*, consists of twenty-three species, most of which are known in all stages of their metamorphosis. Nearly one hundred European species are described in systematic works. The Javanese series consists of a smaller number, and among this there are several which deviate considerably from the regular typical form. In the latter the larva is cylindrical, long, attenuated in a greater or less degree at both ends, but upon the whole, thicker anteriorly: the form of the head is greatly diversified, it is either simple and rounded, or depressed anteriorly with two lateral erect setæ or horns. In some cases the head is greatly distended posteriorly, in form of a shield, which is moveable and crowned with four or more horns, having serrate edges. Several of the larvæ of this stirps have a tuft of hair on the head and two transverse hairy ridges on the neck, in consequence of which they have an analogical resemblance to the larvæ of one of the stirpes of the Bombycidæ. Among the foreign individuals of this group, various very grotesque forms are observed, and the lateral appendages are sometimes greatly developed.

The peculiarities of the larva of this stirps, and more especially the two setæ or caudal appendages, strongly remind us of the *Thysanura*, and the character of the perfect insect confirms this analogy; we find in the Lepidoptera which belong to it, the long setiform antennæ, which are mentioned by Mr. Macleay, Hor. Ent., p. 351, as a peculiar property of the *Lepismæ;* their form is also, on the whole, more elongate than that of the larvæ of the other stirpes.

The *pupa* of this stirps is smooth, shining, often handsomely variegated with colours, but never gilt: its form is subject to many modifications, being regularly oval,

oval, angular, curved, gibbous, triangular, with a pyramidical base and point, and a few acute spinous processes near the middle. It is always attached by the tail and perpendicularly suspended, the capital extremity, which is described as "*gestürtzt*" or directed downwards, is, with few exceptions, terminated by *two* points, which are acute, approximated, or diverging. Figures of many of the European forms of this stirps are given by Sepp and others. Stoll has likewise represented various larvæ and pupæ, which afford a strong confirmation of its uniformity in all parts of the world.

The *perfect insects* of this tribe are characterized by the prevalence of a brown colour on the surface of their wings: although they have in temperate regions generally an obscure exterior, many of the tropical species are exquisitely adorned with a gloss of blue, of most transcendent brilliancy, which is spread over the surface in various shades of intensity. Many examples of this occur in the insects of the new world, and several of a similar character are likewise contained in the Javanese series. Near the boundary of the third stirps, many individuals are marked with waving lines or bands, which cross the wings from the extremity towards the base. The insects belonging to this stirps are likewise, more than all other diurnal Lepidoptera, ornamented with *ocelli*, by which nature appears to have supplied in some measure that comparative deficiency in beauty, arising from a want of brilliancy of tint. The ocellated subdivision of this tribe was named by Linnæus, *Nymphales gemmati*. The *wings* have in most cases their greatest diameter from the exterior to the interior margins, by which means their extent is in the direction of the body of the insect, or from the head towards the tail. They are, in many cases, lengthened, in a posterior direction, to a short rounded tail, the lateral margins being either uniform or irregularly indented. In the European species the posterior wings are either simple, or provided with acute or rounded denticulations.

The *palpi* of this stirps agree in general character with those of the last, but at the confines of the fifth stirps they are more curved and ascending; they rise above the head and the third joint is naked and compressed. In the typical species the *bristles, arising from the basal and intermediate joints are more lengthened and straggling*, the palpi have in consequence a greater appearance of *roughness* and *hairiness* than in the third stirps, and the tuft, at the termination of the second joint, is greatly developed. The *antennæ* are filiform, with a slender very gradually incrassated club, which occupies a large portion of the entire length of this organ. In the typical genera they are of a great length, and exhibit, as has already been pointed out, one of the characteristic peculiarities of this stirps. The *anterior feet* are small and hairy, with a single tarsal member: they possess the characters from

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which these organs have been termed *spurious*, in a higher degree than the anterior feet of the Scolopendriform stirps. The *intermediate* and *posterior feet* agree in most particulars with those of the former stirps of this tribe.

The *abdomen* is shorter, in proportion to the wings, than in the three former stirpes; in some individuals it is provided, in the male, at the sides and extremity with fascicles of long silky hair, which extend themselves horizontally. The *proboscis* is of moderate length and size.

In the synoptic view of the first tribe, this stirps is designated in the perfect insect by the name of *Maniola*, which was introduced by Schrank; it is, in my opinion, more appropriate than that of *Nymphales*, which, by associating this stirps with the former, tends to keep up the erroneous idea of their identity.

Anopluriform Stirps.—The larvæ of none of the stirpes hitherto enumerated exhibit an analogical resemblance to one or other of the orders of the Ametabola, in a more striking manner than those of the last stirps. Every Entomologist is acquainted with the larvæ of the *Hesperidæ:* they are characterized *by a head comparatively of excessive size, and by an abrupt termination posteriorly*, or in other words, *by the entire absence of every thing like a caudal appendage*. Who is not by this form, strongly reminded of the *Anoplura?* Here is an absolute want of tail, combined with a great development of the capital part of the insect. The form of the common pediculus with its large fore-end and blunt abdomen, readily occurs to the mind, and a similar external structure is exhibited by all Anoplura. At present I shall not pursue this comparison, but referring to the Ametabola, as disposed in the Horæ Entomologicæ, shall remark, that by following the order there pursued, we have now completed the circle of the first tribe of Lepidoptera, namely that of the *Diurnal butterflies*, or *Papilionidæ*, strictly so called. The affinity between the Thysanuriform and Anopluriform stirpes in the larva state, is partially illustrated in the diagram on the third plate, by the twenty-fourth and twenty-fifth figures; the same relation between the Anopluriform and Vermiform stirpes is likewise apparent in the figures exhibited at the point of contact in the diagram. These affinities are confirmed by various peculiarities in the perfect insect, which will be mentioned in the proper place. The approximate disposal of the *Plebeji urbicoli* and the *Plebeji rurales*, by systematic writers, may provisionally confirm this arrangement.

The metamorphosis of the Anopluriform stirps, in its pupa-state, exhibits a very peculiar structure. The *pupa* is not, like that of the former stirpes, angulated, naked, and suspended in the open air, *but it is concealed by a folliculus, or by a covering of a convoluted leaf, and when separated it exhibits a smooth surface resembling that of the nocturnal Lepidoptera*. It has therefore been termed *Tortriciform*, and its relation to one of the stirpes of the *Phalænidæ* has already been pointed out.

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The *perfect insect* of the Anopluriform stirps is, like that of the Thysanuriform stirps, characterized by a predominance of a brown tint, but it wants the defined ocelli of that stirps, and the markings exhibit great beauty and diversity of form. The principal subdivisions that I have hitherto observed are the *Erycinæ*, the *Uraniæ* and the true *Hesperidæ*. The *Erycinæ* are a very remarkable group, and several particulars regarding them will be mentioned in considering the structure of the legs in this stirps. The genus *Urania* is well known as containing several of the most striking Lepidoptera, both as to form and beauty of colours; but it appears to be confined to the New World. In the *Hesperidæ* contained in our collection, the colour is almost uniformly of an intense brown, inclining to black; the spots are white and yellow, partially transparent, but not greatly diversified. The form of the *wings* is comparatively simple; the *anterior wings* are triangular, the *posterior wings* rounded and entire, rarely lengthened or angulated. The most interesting peculiarities of the Hesperidæ by which they are related to the Phalænidæ, have already been mentioned.

The *palpi* in the Anopluriform stirps are greatly diversified in the various subdivisions, and depart more from one particular form of structure, than they do in the other stirpes hitherto considered: they cannot therefore be defined by a general description; but they exhibit three principal modifications. In the true *Hesperidæ* the basal and intermediate joints are robust, broad, depressed, and occupy a large portion of the head inferiorly, on each side of the proboscis; they are closely covered with hair or short bristles, which are in most cases truncated and even, resembling the surface of a brush; the second joint is abruptly truncated at the end; the third joint is naked, but of diversified structure; in some cases considerably projecting and approaching the character of the Vermiform stirps, in others short and nearly concealed by the brush-like covering of the second joint. In the genus *Urania*, the palpi are lengthened, slender, having the second joint greatly compressed and the third delicate, somewhat cylindrical and nearly naked. (Latr. Gen. Insector. iv. p. 207). In the *Erycinæ* the palpi are characterized by shortness and by delicacy of structure: one modification of them is represented on pl. ii. fig. 3, b. The *antennæ* vary considerably in the different subdivisions; in the true Hesperidæ they are filiform at the base with a decided fusiform club, of various proportionate length and form, terminated by an elongated acute point, which is uncinate or hooked. They are, in many cases, marked externally with transverse striæ; but I have not as yet determined the extent and generality of this character. The *abdomen*, in the typical species or true Hesperidæ, is more robust than in the former stirpes of this tribe; its resemblance to that of the Nocturnal Lepidoptera has already been pointed out. The *proboscis* is long, slender, and often partially concealed by the palpi.

The *feet* of the insects belonging to the Anopluriform stirps possess many peculiarities which at present I am not prepared to describe at large; but some remarks

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on the *anterior feet* cannot with propriety be omitted. These are again perfect, being provided with five tarsi, and with claws as in the Vermiform and Juliform stirpes. But there exists, at the confines of the Thysanuriform and Anopluriform stirpes, an intermediate group, by which the transition from one stirps to the other is most strikingly exemplified. This is the small group of *Erycinæ*. *Here the anterior feet are spurious in the male, and perfect in the female.* For an illustration of this most remarkable structure I refer the reader to pl. 11, where in fig. 3, the details of both sexes are exhibited in the dissection; fig. 3, e and f, exhibit the spurious feet of the male, and fig. 3, g, the perfect feet of the female; and the lateral view of the perfect insect, fig. 3, a, shows the relative proportion and situation of the spurious feet in the male, in a very striking manner. I consider it a fortunate circumstance that my Eastern collection has enabled me to illustrate this point, and to show in a satisfactory manner, the union of the two stirpes; for the true region, not only of the group of *Erycinæ*, but of the whole Anopluriform stirps, is the New World. While I have discovered in Java three species of *Erycinæ* and about thirty-five species of *Hesperidæ*, the continent of America has hitherto afforded at least one hundred species of the former, and an innumerable host of the latter. The details regarding the *Erycinæ*, as observed in Java, will be given in their proper place in the work, but I shall add in this place that the metamorphosis of this group, as far as it is yet known, confirms the station assigned to it; and the figure of the larva and chrysalis of *Erycina Midas*, from the sixth plate of the continuation of Cramer, by Stoll, gives an interest to the diagram, which I trust will meet with approbation. I shall only transcribe the remark of Hoffmansegg on this group, contained in his remarks on the *Erycina Oppelii*, in Wied. Zool. Magaz. T. i, No. 2, p. 95. "*Erycina gehört unstreitig, zu dem merckwürdigsten das in der Entomologie angetroffen werden kann.*"

I shall conclude these introductory remarks, with a recapitulation of the various references to the illustrations of the *metamorphosis and perfect insect of the Vermiform and Chilognathiform or Juliform stirpes*, given on the plates belonging to the first part, in order to exhibit them in a connected point of view.

Vermiform Stirps.

Metamorphosis; { *larva:* plate iv, fig. 1, 2, 3, 4, 5.
pupa: plate iv, fig. 1, a; 2, a; 3, a; 4, a; 5, a.

Perfect Insect. {
General form and habit, wings, body, head, &c.: pl. i, fig. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11. Pl. ii, fig. 4, 5, 6.
Palpi: pl. ii, fig. 4, b; 5, b; 6, b. Pl. iv, 1, b; 2, b; 5, b.
Antennæ: pl. i, fig. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11. Pl. ii, 4, c; 5, c; 6, c. Pl. iv, 1, c; 2, c; 5, c.
Feet; { *anterior:* pl. ii, fig. 4, e; 5, e; 6, e. Pl. iv, 1, e; 2, e; 5, e.
middle: pl. ii, fig. 4, f.

Proboscis: pl. ii, fig. 4, d; 5, d; 6, d. Pl. iv, 1, d; 2, d; 5, d.

Chilognathiform or Juliform Stirps.

Metamorphosis ; { *larva :* pl. iv, fig. 6, 7, 8, 9, 10, 11, 12, 13. Pl. iii, 1, 2, 3, 4, 5.
pupa : pl. iv, fig. 6, a ; 7, a ; 8, a ; 9, a ; 10, a ; 11, a ; 12, a ; 13, a. Pl. iii, 1, a ; 2, a ; 3, a ; 4, a ; 5, a. }

Perfect Insect { *General form and habit, wings, body, head, &c.* Pl. i, fig. 12, 13, 14, 15.
Palpi : pl. iv, fig. 8, b ; 9, b ; 10, b ; 11, b ; 12, b ; 13, b.
Antennæ : pl. i, fig. 12, 13, 14, 15. Pl. iv, 8, c ; 9, c ; 10, c ; 11, c ; 12, c ; 13, c.
Feet ; { *anterior :* pl. iv, fig. 8, e ; 9, e ; 10, e ; 11, e ; 12, e ; 13, e.
claws : pl. iv, 8, f ; 9, f. }
Proboscis : pl. iv, 8, d ; 9, d ; 10, d ; 11, d ; 12, d ; 13, d. }

All the preceding details are taken exclusively from Javanese insects, belonging to the series arranged in the Honourable East-India Company's Museum.

In the diagram on the third plate, the object has been to illustrate the most prominent forms of each of the five stirpes, several subjects have, therefore, been selected from the works of *Sepp, Abbot,* and *Stoll's* continuation of *Cramer,*

Vermiform Stirps	Fig. 11.	Polyommatus ——— ?	*Sepp.*
	— 12.	Thecla Favonius	*Abbot.*
	— 13.	Thecla Betulæ	*Esper.*
Chilognathiform Stirps	— 14.	Colias Marcellina	*Stoll.*
	— 15.	Pontia Brassicæ	*Sepp.*
	— 16.	Papilio Ajax	*Abbot.*
	— 17.	Papilio Polydorus	*Javan. Metam.*
Chilopodiform Stirps	— 18.	Heliconia Euterpe	*Stoll*
	— 19.	Heliconia Amphione	*Do.*
	— 20.	Heliconia Thalia	*Do.*
	— 21.	Acræa Vesta	*Jav. Met.*
	— 22.*	Biblis Leucothoë	*Do.*
	— 23.	Genus allied to Limenitis	*Do.*
Thysanuriform Stirps	— 24.	Melanitis undularis	*Do.*
Anopluriform Stirps	— 25, 25, a.	Erycina Midas	*Stoll.*
	— 26.	Hesperia ——— ?	*Jav. Met.*

* In this species the spines are alternately long and short, in other respects it resembles the larvæ of the typical group. The genus *Biblis* is here applied strictly according to the views of Fabricius, who gives Leucothoë as one of the typical species. M. Latreille has placed in the genus Biblis several insects, which agreeably to the metamorphosis belong to different groups.

I regret that the plan of the diagram has not permitted me to exhibit various highly instructive forms, but the most important will follow in the course of the work.

A

DESCRIPTIVE CATALOGUE,

&c. &c.

LEPIDOPTERA.

THE station of this order in the sub-kingdom of *Annulosa,* is clearly indicated in the Horæ Entomologicæ. The LEPIDOPTERA are here arranged in the class of *Haustellata,* between the orders of *Diptera* and *Homoptera.* In the diagram which exhibits a view of the classes of the Annulosa, they meet the order of Trichoptera, and thus form a connexion between the classes of Haustellata and Mandibulata. See Hor. Ent. p. 390. The relation of the Lepidoptera to the Homoptera is more particularly pointed out in page 375 of the same work; and that to the Diptera, in page 379. I therefore refer the reader, for a more detailed exposition of Mr. Macleay's views of the natural situation of this order, to the pages cited; where the *analogy* of the Lepidoptera to the other orders of Annulosa is likewise pointed out, in a tabular view; see page 392.

The LEPIDOPTERA *are chiefly distinguished from the other orders of Annulosa, by their* mouth, wings, *and* metamorphosis. *The acute observations of M. Savigny show that the* mouth *is provided with* lips, mandibles, *and* maxillæ. *The latter by their union form the* proboscis, *and are thus described:* mandibles, *at their base, intimately united with the* lower lip, *elongated, canaliculated, forming together by the union of their plates, a tubular spirally-convoluted* proboscis, *which is concealed by the palpi.* The mandibles *are very minute, distant, slightly or not at all moveable, and unfit for mastication. There are four* palpi, *of which two are* maxillary *and two inserted at the base*

of

of the lower lip. *The latter are denominated* labial palpi. *The* wings, *four in number, are membranaceous, more or less covered with minute imbricated scales. The* metamorphosis *is technically termed* obtect.

Observation.—The metamorphosis of this order is the most remarkable, the most diversified, and the most intricate in the sub-kingdom of Annulosa. I have already stated my intention of deriving from it the basis of my arrangement. It shall be my endeavour to analyze and follow its variations, as my clew to a general subdivision of the whole order. In the first tribe the outline of a subdivision has been sketched; and I now submit it to the candid examination of Entomologists. It might, perhaps, be expected, that I should, at the commencement, give a similar descriptive and discriminating analysis of the metamorphosis of each tribe, in all its details; but, on this subject, I must without reserve acknowledge my inability. In the first tribe, I had the advantage of being guided by analogical relations; and it appears to me that the stirpes of this tribe exhibit types of the modifications which take place in the metamorphosis of the remaining tribes. I shall observe, by way of illustration, that a similar state of things occurs among the Mandibulata. We here find, in the metamorphosis of one order, the Neuroptera, types of the diversified metamorphosis of the whole class. See Horæ Entom., p. 433. But I am not prepared, at present, to show how the same principle applies to the Lepidoptera in general, or to analyze and describe the metamorphosis of each tribe, in the manner in which I have attempted to elucidate the metamorphosis of the *Papilionidæ.* This would lead me into the very mistake I am anxious to avoid, and produce an artificial arrangement. It is true, there are many observations in the Wiener Verzeichnis, which assist in forming a general system founded on metamorphosis; and I have adopted them so far as I could with safety, and with the intention of pursuing them in the course of this work. I have no hesitation in stating in this place, that the indications given in the work just mentioned, lead to more accurate views on this subject than those generally found in Entomological works. We are directed to attend not only to the number of the feet of the larvæ, but to analyze them with rigorous exactness, to notice every particular of their structure, *viz.* the deviation from the regular cylindrical form, whether ovate, fusiform, oblong, depressed, &c.; the form of the segments, whether merely annular or produced into scuta, &c.; the adventitious appendages to the head, sides, tail, &c. whether provided with a furcula, a bicuspid anal appendage, &c.; the diversified form of the head and its appendages; the multifarious protuberances, excrescences, warts, and fleshy caudiform appendages; and particularly the external covering, whether smooth, hairy, villose, spinous, with the various modifications of the hairs and spines. It is probable, that as accurate observations are extended, these will assist in affording clear indications for permanent subdivisions. But, in the present state of our materials, I shall adhere to the excellent rules on this head contained in the Horæ Entomologicæ. I shall examine principally the *variations* in the metamorphosis, and endeavour to obtain from them the indications of the *higher groups.* Wherever the modifications in the metamorphosis are numerous, I shall endeavour to ascertain whether they lead to the establishment of genera or further subdivisions. The first tribe affords an example of the assistance derived from a minute acquaintance with the metamorphosis, in the determination of natural groups, whether stirpes, genera, or further subdivisions. On this subject I have frequently referred to the authors of the Vienna Catalogue. Next to these, Schrank has most closely consulted metamorphosis, in its various modifications, in his arrangement, and on its importance as a guide to minor subdivisions,

subdivisions, he has the following ingenious observation: "Metamorphosis, in its larva state," he says, "may, and I think must be, taken into the characters of genera, in the absence of other sufficiently distinctive notices. Those Botanists who have derived their systems primarily from the *fruit*, have nevertheless a regard to the *flower*, and by this means reciprocally elucidate existing obscurities. *Caterpillars are the* FLOWERS *of the Lepidoptera.* They are indeed not always present when the perfect insects are before the examiner. *But, is the case different with the Botanist?*" The application is evident, and I shall conclude this observation with the following remark of the author of the Horæ Entomologicæ. "As the knowledge of the whole life of an insect must make us better acquainted with its nature than a mere description of one of its forms, in the same proportion ought metamorphosis to outweigh every other principle of arrangement." Horæ Entom., page 448.

I proceed to the consideration of the first tribe of Lepidoptera, the PAPILIONIDÆ, consisting of the *Lepidoptera Diurna* of Latreille, the *Tagschmetterlinge* oder *Falter* of Denis and Schieffermüller, Ochsenheimer, &c.; the genus *Papilio* of Linnæus, *Les Papillons* Reaum., Geoff., &c.

CHARACTER OF THE TRIBE: *Metamorphosis: Larva* provided with sixteen feet, elongated, cylindrical, with a globose head, attenuated posteriorly, retractile, attached by means of a contracted articulation, so as to appear in the typical species, when exserted, disjoined from the body, of a slow, tardy habit. (It presents *five* principal modifications of form.)

Chrysalis naked, angular, attached by the tail, but variously suspended; in one stirps only folliculated, or covered by a contorted leaf, in the same manner as some of the Nocturnal Lepidoptera.

Perfect Insect: Antennæ composed of numerous articulations, slender at the base, incrassated towards the tip, rarely filiform, but generally terminated by a club, which is variously modified in the different subdivisions. *Wings* erect when the insect is at rest, without hook at the margin of the lower wings; in one stirps the posterior wings only are elevated. *Posterior tibiæ*, in most cases, with a single pair of spurs at the tip only. They all fly in the day.

CHARACTER TRIBUS. Metamorphosis: Larva *pedibus sedecim, elongata, cylindrica, tarda; capite globoso retractili; exserto, a corpore disjuncto.*

Chrysalis *nuda, angulata, posticè alligata, sed vario modo suspensa; in stirpe anopluriformi subfolliculata lævis, et Lepidopterorum aliquorum nocturnorum chrysalidi similis.*

Imago: Antennæ *multiarticulatæ, basi graciles, apice crassiores plerumque capitulatæ aut clavatæ, in paucis filiformes vel subsetaceæ vel apice graciliore uncinato.* Alæ *insecto sedente erectæ, inferiores retinaculo nullo. In stirpe anopluriformi alæ posticæ tantum erectæ vel suberectæ.* Tibiæ posticæ *plerumque apice solo calcarato. Volatus diurnus.*

This tribe, according to the modifications of the larva, is divisible into five *stirpes* or *races*, a connected view of which is given in the following Table.

STIRPES.	ANALOGY, to the class of AMETABOLA, *Macleay*.	METAMORPHOSIS.
STIRPS I. VERMIFORM. The reader is referred to the diagram contained on the third plate, where several of the typical forms of the larvæ of the genera arranged in the sixth column are represented, with the view to illustrate the second column.	VERMES. *Genera*, in the order of their affinity, illustrating the analogy to the larvæ of the Papilionidæ. ENTOMODA, } *Epizoariæ*, Lamarck. ASCARIS, STRONGYLUS, } *Entozoa*. Rudolphi. ONISCUS, ARMADILLO, PORCELLIO, } *Oniscidæ*. (The three genera last enumerated have their natural station between the Ametabola and the Crustacea; it is remarkable that the analogy is more apparent in the osculant group of *Oniscidæ* than in many of the true Vermes.)	LARVA, *transversely striated*, oblong, attenuated at both ends, convex or cylindrico-gibbous, in some cases depressed; *head* small and retractile; *feet* short, and generally concealed by the scutiform segments of the body. PUPA, *smooth*, obtuse at both ends, attached by the caudal extremity with the head upwards, and *secured in an erect attitude by a brace*.
STIRPS II. CHILOGNATHIFORM or IULIFORM.	CHILOGNATHA. GLOMERIS. (As to the affinity between this genus and *Porcellio*, see Horæ Entom., p. 348.) IULUS. POLYDESMUS. CRASPEDOSOMA. (At the confines of the next order.)	PUPA, attached and suspended as in the Vermiform stirps, *angulated*, with two processes at the anterior extremity. LARVA, elongated, cylindrical, attenuated at the ends, somewhat distended about the fourth segment, with the *head attached by a small articulation, appearing, when exserted, distinct from the body*, with a *furcula* or *bifid, fleshy, retractile organ*, between the head and neck.

PERFECT INSECT.	NAMES, descriptive of the stirpes or of the subdivisions, in their different states.	GENERA. *Normal,* in the regular Lepidopterous circle.	GENERA. *Aberrant,* or departing from the regular series, (and genera of which the affinity has not been determined).
ANTENNÆ, *clavate,* very gradually and uniformly incrassated, or *filiform* and terminated by a cylindrical compressed club *abruptly bent outward.* PALPI, with the *third joint very long, naked,* and directed forward, the basal and intermediate joints slender, elongated, and sparingly covered. FEET, *mid-legs with a short spinous process to the tibiæ,* anterior legs perfect, rarely slightly abbreviated. *Claws* minute, single in the anterior feet of the male. WINGS, erect, when the insect is at rest; *anterior wings* oblong or triangular, *posterior wings* entire, dentated, or provided with one or more *linear* or *filiform caudal appendages. Nervures* simple, delicate, *discoidal areola not closed.*—(Jones in Linn. Trans., vol. ii. p. 63, &c.) ABDOMEN, small, slender, and compressed. PROBOSCIS, moderately elongated, naked or provided with transverse bristles at the extremity. FLIGHT, comparatively slow.	SCHILDFALTER—CUPIDO—*Schrank.* PLEBEII RURALES. *Linn.* POLYOPHTHALMI. *Aldrov.* POLYOMMATIDÆ. *Swainson.* LYCÆNIDÆ. *Stephens.* *Les Argus,* Geoffr. *Blues.* *Les Bronzés,* Geoffr. *Coppers.* *Les petits portes-queue,* Geoff. *Hairstreaks.* *Larvæ gibboscutatæ.* Fam. N, Wien. Verz. *Larvæ oblongoscutatæ.* Fam. M, W. V. *Larvæ depressoscutatæ.* Fam. O, W. V. *Larvæ contractæ.* Esper. *Larvæ onisciformes.* *Asselförmige Raupen.* *Chenilles Cloportes.*	PETAVIA. This genus, nearly related to Hesperia, forms in our series the transition from the Anopluriform to the Vermiform stirps. POLYOMMATUS. LYCÆNA. THECLA. MYRINA.	SYMETHA.
ANTENNÆ, *marked with prominent rings at the joints,* elongate, filiform at the base, incrassated towards the club, which is cylindrical and attenuated at both ends, or oval, compressed with the annuli crowded towards the extremity. PALPI (in the typical group), shorter than the head, *the third joint very minute,* the basal and intermediate joints concealed by a covering of bristly hair; (in the genera near the vermiform stirps the third joint slightly projecting.) FEET, *long* and *robust, tibiæ* of the anterior feet, in the typical group, *with a short acute process near the middle;* (in Colias slightly abbreviated.) *Claws* large and robust. WINGS, erect, when the insect is at rest; subfalcate, or simple and triangular. *Nervures strong and prominent, discoidal areola closed,* posterior wings cut out to receive the abdomen, often provided with *spatulate caudal appendages.* ABDOMEN, cylindrical. PROBOSCIS, long and robust. FLIGHT, strong and rapid.	PAPILIONES (strictly so called). EDELFALTER—PIERIS—*Schrank.* EQUITES—*Troes et Achivi.* } *Linn.* HELICONII. } *Linn.* DANAI CANDIDI. } *Linn.* DANAI FLAVI. *Wien. Verz.* PARNASSII. *Fabr.* *Larvæ variegatæ.* Fam. C, W. V. *Larvæ mediostriatæ.* Fam. D, W. V. *Larvæ pallidiventres.* Fam. E, W. V. *Larvæ bombyciformes.* Fam. B, W. V. *Larvæ nudæ.* (Equites) *Esper.* *Larvæ holosericeæ.* } Heliconii—*Esper.* *Larvæ pilosæ.* } Heliconii—*Esper.* *Swallow-tails.* *Black-veins.* *Whites.* *Clouded-yellows.* *Brimstones.*	COLIAS. *Gonepteryx.* PAPILIO. Sect. I. *antennæ with prominent annuli.* Sect. II. *antennæ with an oval compressed club.* Sect. III. *antennæ with obscure annuli.*	*Terias.* *Pieris.* *Pontia.* *Leucophasia.* *Licinia.* *Thais.* *Doritis.* *Zelima.*

STIRPES.	ANALOGY, to the class of AMETABOLA, *Macleay*.	METAMORPHOSIS.
STIRPS III. CHILOPODIFORM OR SCOLOPENDRIFORM.	CHILOPODA. Scolopendra. Lithobius. Scutigera.	LARVA, cylindrical, *with rigid filiform appendages*, (naked and few in number at the confines of the last stirps, in the typical group numerous,) *disposed in longitudinal series along the body and armed with verticilli of acute diverging spines*. PUPA, *angular*, oblong, or compressed, diversified on the surface, even, tuberculated, or notched; the headcase obtuse, rounded, or tuberculated; *ornamented with shining dots or lines*, or entirely covered with a golden lustre: *suspended by the tail, with the head precipitous or directed downward.*
STIRPS IV. THYSANURIFORM.	THYSANURA. Lepisma. Forbicina. Podura. Smynthurus.	PUPA, suspended as in the Chilopodiform stirps, smooth, shining, often *handsomely variegated with colours;* variously modified as to form, oval, angular, curved, gibbous, or triangular, with a pyramidical base and point; *terminated by two acute points, which are either approximate or diverging.* LARVA *with a bifid tail or furcula from the posterior part of the abdomen, consisting of two rigid setæ or spines, pointing directly backward;* having an elongate cylindrical form, slightly attenuated at both ends; head emarginate above or provided with two erect setæ or points in some species greatly distended posteriorly, forming a kind of moveable shield, which is crowned above with four or more membranaceous horns having serrate edges.

PERFECT INSECT.	NAMES, descriptive of the stirpes or of the subdivisions, in their different states.	GENERA. *Normal,* in the regular Lepidopterous circle.	*Aberrant,* or departing from the regular series, (and genera of which the affinity has not been ascertained.)
ANTENNÆ, filiform at the base, *with a club rising abruptly at the extremity,* in the typical species broad and compressed, and in one of the subdivisions orbiculate. PALPI, with the basal and second joints broad and robust, covered with hair and beset underneath with long straggling bristles, *the third joint projecting beyond the head, covered with down;* converging in the typical species and forming a *rostellum* or *beak:* a tuft of long hair at the extremity of the second joints. WINGS, erect in the resting insect: *anterior wings* narrow and greatly expanded, *with angulated, scalloped, or deeply indented margins; posterior wings* with a deep abdominal groove, entire or dentated, rarely with short, acute caudal appendages; : *nervures* distinct: *discoidal areola closed.* ABDOMEN, either slender and compressed, or, in the typical group, robust and abbreviated. PROBOSCIS, long and robust. FLIGHT, strong and rapid. FEET, intermediate and posterior, terminated by claws and pulvilli with *membranaceous, pubescent, bifid appendages at their base: anterior feet spurious and imperfect.*	DORNFALTER—PAPILIO—*Schrank.* DANAI FESTIVI. } *Linn.* in part. NYMPHALES PHALERATI. } *Linn.* in part. NYMPHALES GEMMATI. } *Linn.* in part. HELICONII. *Fabr.* NYMPHALIDÆ. { *Swainson and Stephens,* in part. *Larvæ acutospinosæ.* Fam. I, Wien. Verz. *Larvæ pseudospinosæ.* Fam. L, W. V. *Larvæ collospinosæ,* Fam. K, W. V. *Larvæ subspinosæ.* Fam. H, W. V. *Larvæ spinosæ.* Esper. *Papiliones angulati. Eckflügelichte Falter.* *Papiliones variegati. Scheckichte Falter.* *Papiliones nobiles. Silberreiche Falter.* *Papiliones multifasciati. Fleckstreifigte Falter.* *Les argentés.* Geoffr. *Silver-spotted* } *Fritillaries.* *Les damiers.* Geoffr. *Buff-spotted* } *Fritillaries.*	EUPLOEA. IDEA. ACRÆA. VANESSA. CYNTHIA. MELITÆA. ARGYNNIS. BIBLIS. (Strictly as applied by *Fabricius.*) LIMENITIS. *Gen. Nov.* Limenitidi affine.	HELICONIA. *Hetæra.* (?) LIBYTHÆA. NEPTIS. (?)
—	—		
FEET, anterior as in the last stirps. ANTENNÆ, filiform, *surpassing in proportionate length these organs in all other stirpes of this tribe; club slender.* PALPI, curved, *ascending, with the third joint naked,* compressed, and rising above the head. WINGS, generally of a brown colour, and, in many species, adorned with a brilliant gloss of blue and pre-eminently marked with large ornamental *ocelli* appearing often on both surfaces; with the greatest expansion from the anterior to the posterior margin, or in the direction of the body of the insect: *hinder wings,* with a deep abdominal groove, entire, dentated, or produced to a short round point. *Discoidal areola not uniformly closed.* ABDOMEN, short; the male of some species provided with fascicles of long silky hairs. PROBOSCIS, of moderate length and size. FLIGHT, slow.	STUTZFALTER—MANIOLA—*Schrank.* NYMPHALES GEMMATI. *Linn.* in part. NYMPHALIDÆ. *Swainson* and *Stephens* in part. *Larvæ cornutæ.* Fam. G, Wien. Verz. *Larvæ subfurcatæ.* Fam. F, W. V. *Larvæ bicaudatæ.* Esper. *Papiliones versicolores. Schielende Falter.* *Randaugigte Falter.* *Les changeants.* Mus. Richt. *Les Grimpans.* Geoffr.	APATURA. *Genus Novum.* PAPHIA. AMATHUSIA. MORPHO. *Genus Novum.* MALANITIS. HIPPARCHIA. NEMEOBIUS. (Forming the transition to Erycina?)	*Cethosia.* BRASSOLIS.

STIRPES.	ANALOGY, to the class of AMETABOLA, *Macleay*.	METAMORPHOSIS.
STIRPS V. ANOPLURIFORM.	ANOPLURA.	LARVA, with a *head of excessive size* attached to the body by a long neck, *abruptly terminated behind* and entirely deprived of a caudal appendage. (In some of the *Erycinæ* the head of the larva has two erect spinous appendages resembling those of the Thysanuriform stirps.) PUPA, *concealed by a folliculus, or by the covering of a convoluted leaf, resembling that of some of the nocturnal Lepidoptera.*
	PEDICULUS.	
	NIRMUS.	
	CECROPS.	
	CALIGUS.	
	This genus leads to *Entomoda* among the *Epizoariæ,* with which we commence the circle of Ametabola. (See above, p. 58.)	

In explanation of the *second* column of this table, which is intended to illustrate the *analogies* of the larva of the first tribe of Lepidoptera, I refer the reader to page 286, and to pages 350 and 351 of the Horæ Entomologicæ. Mr. Macleay here traces the Ametabola from the Chilognatha to the Vermes; hence to the Anoplura; further to the Thysanura and to the Chilopoda, whence he returns to the Chilognatha and completes the circle. He therefore pursues a circular course in a direction opposite to that of our table, but the succession of affinities is the same although here reversed. He commences with the Chilognatha; from these he proceeds to the most imperfect Annulose animals, with the following observation (p. 351). " Articulation is not very distinct in some of the *Epizoariæ* of Lamarck, but sufficiently so to lead us to the *Caligi* of Muller and the genus *Cecrops* of Dr. Leach." (This genus, although generally arranged among the Crustacea, is placed by Mr. Macleay in the class of Ametabola; Lamarck had indeed already expressed a doubt as to its really being crustaceous.) " The genus *Cecrops* by its general form, antennæ, structure of the feet, *and want of posterior appendages*, prepares us for the Anoplura. These we quit for the genus *Smynthurus* of Latreille, and by means of it enter among the *Thysanura*. Some of these, such as the *Lepismæ* of Latreille, have an elongate form, long setiform antennæ, various small appendages on each side representing false feet, together with articulated setæ terminating the posterior part of the body." " Thus," continues Mr. Macleay, " we come to the larva state of the *Chilopoda*, or *Scolopendræ* of Linnæus, from which, bearing in recollection the form and structure of the genus *Craspedosoma* of Leach, we return to the *Chilognatha* and complete the circle of *Ametabola*."

In

PERFECT INSECT.

FEET, *anterior*, at the confines of the Thysanuriform stirps, in the group of *Erycinæ*, *spurious in the male, perfect in the female;* in the *Hesperidæ* and *Uraniæ* perfect in both sexes; *hinder tibiæ provided with two pair of spurs, one in the middle the other at the tip.*

ANTENNÆ, diversified in the different groups: in the *Erycinæ* provided with an *oval club* attenuated at both ends; in the *Hesperidæ* filiform at the base with a *fusiform club, terminated by an acute point, which is uncinate or hooked;* in the *Uraniæ* lengthened and filiform, with a *slender elongate club.*

PALPI, in the *Erycinæ* very short, scarcely projecting beyond the head, third joint very minute; in the *Hesperidæ* the basal and intermediate joints broad, depressed, and closely covered with hair or short truncated bristles, the third joint naked; in the *Uraniæ* lengthened and slender, with the third joint delicate and nearly naked.

WINGS: in the resting insect the *hinder wings only are elevated:* in the Hesperidæ the brown colour prevails, inclining to black, and the wings are marked with white or yellow semi-transparent spots; the anterior wings are mostly triangular: the *caudal appendages*, of the posterior wings, generally *curved: discoidal areola not closed.*

ABDOMEN, short and thick. HEAD, large. EYES, prominent.

FLIGHT, strong and rapid.

NAMES,

descriptive of the stirpes or of the subdivisions, in their different states.

DICKFALTER—ERYNNIS—*Schrank.*
PLEBEII URBICOLI. *Linn.*
HESPERIDES. *Latr.*
HESPERIDÆ. *Leach.*

Les Estropiés. Geoffr.
Les Bourgeois. Scba.
Skippers and Grizzles. Haworth.

LARVÆ TORTRICIFORMES.
Afterwicklerraupen.

GENERA.

Normal, in the regular Lepidopterous circle.

ERYCINA.
Emesis.
Danis.
Lemonias.
Eurybia.
HESPERIA.
Thymele.
Helius.
Pamphila.
Ismene.
Tamyris.

Aberrant, or departing from the regular series, (and genera of which the affinity has not been determined).

Nymphidium.
Helicopis.
URANIA.
BARBICORNIS.

(Ce nouveau genre rapproché des Uranics par ses antennes sétacées, fait le passage de la tribe des PAPILIONIDES à celle des HESPERIDES.) *Latreille*, in Encyclop. Method., p. 705. Art. Papillon.

In the *third* and *fourth* columns, which exhibit a view of the metamorphosis and perfect insect, it has been my object to direct the attention of the reader to the typical characters, by marking them in italics; and some of the most prominent characters, which show the natural transitions from one stirps to another, are placed at the point of connexion and indicated by a brace.

In the *fifth* column I have given the first place to the names employed by Schrank, as his general division of the *Papilionidæ* agrees with ours, and each of his names is descriptive of one of our stirpes. I have also extracted in each stirps, the family names of the Wiener Verzeichnis, as they are, in most cases, highly appropriate. But I have not attempted to introduce all the names employed by authors for the subdivisions of the stirpes.

In the *sixth* column, I have endeavoured to arrange the genera according to their natural affinities, as far as my materials have enabled me: as however in an attempt of this nature, from a local collection, many interruptions in the series must necessarily occur, I have endeavoured to supply the connecting links from other sources; but many deficiencies remain to be supplied by future discoveries.

VERMIFORM STIRPS.

Typical Character.

Larva, as to form, either ovate, oblong, cylindrical, or linear; as to surface, convex, gibbous, or depressed: always marked with prominent transverse striæ or divided into scutiform segments: most generally naked, in some cases villous, rarely provided with lateral appendages: underneath smooth: having a small head and minute feet, partially concealed by the abdominal segments.

Pupa, smooth, obtuse at both ends, attached by the caudal extremity by means of a slight filamentous texture, secured in an erect attitude by a brace, the head being directed upwards.

Larva formâ ovata, vel oblonga, vel cylindrica, vel linearis; superficie convexa, gibba, vel depressa: semper tranversè striata, segmentis scutiformibus: nuda, vel nonnunquam pilosa, rarius appendiculis lateralibus instructa: subtùs glabra: capite minuto, pedibusque vix apparentibus. (*Tota quoad habitum* Onisco, Porcellioni, *vel* Epizoariis *similis.*)

Pupa nuda, utrinquè obtusa, posticè alligata, capite sursùm spectante, filis collo et abdomine circumligatis erectè ferè suspensa.

Observation.—The peculiarities of the perfect insect of this stirps have already been detailed in pages 38, 39, and 40 of the Introduction; they are likewise exhibited on the Synoptic Table. I shall, therefore, not recapitulate them in this place. The regular order of the plan of Mr. Macleay would require that I should proceed to the division of the *Stirpes* into *Families;* but this would require a more extensive examination of materials, and more numerous references and comparisons, than I am enabled to undertake at present. I shall, therefore, defer the attempt to a more favourable period. For my immediate purpose it is sufficient to state, that the genera *Petavia, Polyommatus, Lycæna, Thecla, and Myrina,* are individually representatives of Families, for the precise subdivisions of which a general acquaintance with all the species hitherto collected, and to be found in cabinets of Entomology, would scarcely be sufficient.

Genus

Genus POLYOMMATUS.

Papilionis—Plebeiorum ruralium—species. *Linn.* Polyommati species. *Latr.* Polyommatus. *Stephens' Synopsis of British Entomology, May* 1827. Lycænæ Species. *Fab.* Papiliones, Fam. N. Larvæ gibboscutatæ. *Wiener Verzeichnis,* 181. Papiliones Polyophthalmi. *Aldrov.* Les Argus. *Geoffr.* Cœruleæ, Blues, or Arguses. *Haworth.*

Character. *Larva* gibboscutata, sublinearis, dorso elevato, capite parvo plerumque nigro.

Chrysalis oblonga vel ovata, nuda, maculis obscuris; in nonnullis tuberculis acutis singulariter notata, simiæ vultum simulans. Tab. i, fig. 2, b.

Imago: Antennæ filiformes, articulis intermediis longioribus, capitulo ovali, abruptè refracto, compresso, sulcato, vel concavo marginibus subinvolutis.

Palpi capite longiores, porrecti, assurgentes; articulis basilari et intermedio nudiusculis, squamis villisque sericeis tectis, hoc elongato, ultra medium capite soluto, tertio gracili, attenuato, nudo.

Proboscis palpis circa duplò longior.

Caput latiusculum, globosum. *Oculi* prominuli. *Corpus* gracile, compressum. *Alæ* integerrimæ, alterius plerumque sexus cœruleæ, alterius sæpius brunneæ, interdum strigâ macularum fulvarum ad marginem posticum; subtùs semper griseæ, punctis seu ocellulis pluribus nigris sæpius albocinctis. *Pedes* omnes tarsis quinque, ultimo unguiculato: *femora* intermediorum, apicem versus processu brevi, acuto, villoso instructa, tibiæque acetabulo ad illum recipiendum exaratæ. *Tarsi* anticorum maris attenuati, setis lateralibus brevissimis vestiti, ultimo sæpius ungue solitario vel setâ obscurâ terminali; fœminæ villosi, unguibus duobus parvis fortiter arcuatis lanugine reconditis. *Ungues* et *pulvilli* posticorum parvi.

Character. *Larva* linear or oblong; in form more elevated and rounded than in the other genera of this stirps, the back being, in the middle, cylindrico-gibbous. *Chrysalis* somewhat oblong or ovate, naked with obscure spots; in some cases singularly marked with short acute processes, arranged so as to resemble the face of a monkey. *Antennæ* of moderate length, many-jointed, filiform and straight to the origin of the club, where they are suddenly reflected or bent outward; joints short and somewhat swelled at the base and apex, slender and lengthened in the middle; club, constituting about one-sixth of the whole length of these organs, ovate, compressed, or grooved in the middle, with the sides slightly involuted. *Palpi* longer than the head, porrected, assurgent; basal joint short, closely applied to the head, second joint lengthened, at the base adhering to the head, from the middle detached and curved upwards; both these joints being sparingly covered with minute scales and hairs; third joint slender, attenuated, naked, stretching forward or assurgent (rarely surrounded with a tuft of bristles arising from the extremity of the second joint). *Proboscis,* double the length of the palpi, but varying in different species. *Head* rather broad. *Eyes* prominent. *Body* slender and compressed. *Wings: anterior* simple and oblong; *posterior* entire and rounded, slightly grooved for the reception of the abdomen: the upper surface of the wings almost invariably blue in the male and brown in the female; the under surface in both sexes white or gray, and marked with black ocellated spots surrounded with a white iris. *Feet* all invariably perfect and provided with five *tarsi*: thighs of the *mid-legs* with a short, acute, often hairy, process, which is received in a corresponding socket of the tibiæ: *tarsi* of the fore-legs in the male attenuated,

bearing

bearing at the sides short bristles, last joint mostly terminated by a single claw or by an obscure spine; in the female the tarsi are covered with short villi, and the joint has two strongly curved claws, which are concealed by tufts of short hair. The *claws* and *pulvilli* of the hind-legs are small.

* *Wings somewhat elongated; hinder wings entire, regularly rounded and elliptical.*

Subgenus PITHECOPS.

1. PITHECOPS HYLAX. *Alæ suprà saturatè fuscæ, posticæ fimbriâ marginali argenteâ;* fœminæ *anticæ maculâ discoideâ angulari albâ: subtùs canescenti-albæ, strigis duabus arcuatis flavo-fuscis, serie macularum fasciâque marginali continuâ nigris; anticæ punctis duobus costalibus, posticæ guttâ apicali saturatâ maximâ et interdum puncto anali obsoletiore nigris.* (Expansio alarum, lineæ 10—14.)

Plate I, fig. 2; 2, a.

Hesperia R. Hylax. Fab. Ent. Syst. em. tom. 3. pars. 1. p. 304. No. 152.

Polyommatus Hylax. MM. Latreille et Godart, Enc. Méth. Hist. Nat. ix. 701.

Wings above, in the male, deep blackish brown, the colour being uniformly spread over the whole surface to the border of the hinder wings which is silvery white; a very delicate gray fringe interrupted with brown, bounds the forewings: *beneath* white with a grayish-silvery gloss inclining to blue, and the scales covering their surface large and rough; *anterior wings*, marked near the costa, with two small irregular dots of an intense black; *hinder wings*, at the posterior angle with a large regularly circumscribed spot of the same colour; a minute dot is in some individuals obscurely perceptible near their anal angle: somewhat beyond the disk both pair of wings are traversed by a delicate, undulated, interrupted striga of reddish brown, exterior of this by a broader continued fascia of the same colour, undulated at its outer edge; next follows an interrupted series of oblong spots, and finally a regular narrow marginal line of intense black, exterior to which the wings are bounded by a silvery fringe: *legs* covered with lax villi of silvery-white; *tarsi* surrounded by a black ring; *body* brown above and white underneath; *eyes* uncommonly prominent, and bordered with white; *antennæ* brown, annulated with white. In the female the wings are somewhat broader, and the disk of the anterior pair is marked with a rhomboidal white patch, more intensely coloured exteriorly.

There are four specimens of this insect, two of each sex, contained in the Honourable Company's Museum. The species, although but little known, appears to have an extensive range; Eastern India is mentioned by Fabricius as the native place on the authority of Dr. Kœnig. The collection of A. H. Haworth, Esq. contains a female specimen from Bengal. Another species was bred from the caterpillar, and the chrysalis which produced it is represented on our first plate, fig. 2, b. The caterpillar feeds on a leguminous plant. The only individual obtained passed into the pupa state before an opportunity existed of delineating it, and I subsequently sought it in vain. The history of this species will be given after the description of *Petavia,* at the close of the series.

In many essential points, the form of the palpi and antennæ, the peculiarities of the feet, &c. these insects agree with the character of the genus Polyommatus, but their habit and aspect are very peculiar; this is owing to the great length and lateral expansion of the wings, to their comparative narrowness, and to their being regularly elliptical and rounded in the anal region. The group to which this insect belongs, forms in my opinion a distinct subgenus, to which I have given the name of *Pithecops,* from the peculiar aspect of the chrysalis. Our insect, which is cited by Fabricius as "*minima in hac familia,*" is represented in the European Fauna, by the *P. Alsus* and by several other species which are described by Ochsenheimer with

with "*alæ integerrimæ;*" namely *P. Lysimon*, *P. Pheretes*, and *P. Damon:* there are likewise indications of other foreign species, as the individual figured by Mr. Donovan, which, although the same in form and habit, appears to be specifically different from those in our collection: and the *P. Hanno* of Cramer probably belongs to the same group.

** *Margins of the hinder wings at the anal extremity angular, and produced to a short rounded point.*

POLYOMMATUS strictè sic dictus.

2. POLYOMMATUS AKASA. *Alæ utrinquè albæ, suprà ad basin azureo irroratæ marginibus exteriore et posteriore fuscis, anticarum margine latiore: subtùs serie punctorum margini postico parallelâ; anticæ serie lineolarum submarginali, posticæ arcu punctorum discoideo interrupto punctisque tribus basilaribus fuscis.* (Exp. alar. 1 unc.)

Plate I, fig. 1; 1, a.

Disk of the *anterior wings* and almost the whole of the *posterior wings* white above: base of both pairs, and a broad belt along the anterior and posterior margins of the fore wings, blackish brown; *hinder wings* marked with a few scattered dots of blackish brown and surrounded by a streak of the same colour, interior to which is an interrupted series of delicate brown lines: both pairs are covered from the base to the disk with an azure irroration; (and in one of our specimens the disk is marked with an obscure curved fascia of brown:) *beneath* the milky white surface of the wings has the following marks: towards the posterior margin of the anterior pair, a series of five short brown lines is disposed in an interrupted curve, exterior to which a few faint marginal dots are observed, and a short transverse streak arises near the costa and extends to the middle of the disk; on the hinder wings the marginal dots of a more intense tint are continued in a regular series along the posterior margin; the disk is pervaded by a very irregularly curved series of about seven dots, commencing near the anterior margin, the first being disposed in pairs; three solitary distant dots are placed in the order of a transverse line towards the base. About eighteen dots, in all, may be counted on the lower surface of the posterior wings. *Antennæ* banded with white. *Thorax* and *abdomen* agreeing with the adjoining tint of the wings on both surfaces.

As far as regards the habit, colour, and contour of the wings, this species agrees with the blues of our nomenclature; the antennæ, however, depart in a small degree from the regular type, and give it a peculiar aspect; the club is strongly compressed and semi-contorted at its base, in consequence of which a swelling appears at the point of union with the filiform portion, which is not usual in this genus. This species is not abundant, and two specimens only are contained in the collection. In its physiognomy and in the distribution of the markings of the lower surface, it resembles the *P. Argiolus* of the British Fauna.

3. POLYOMMATUS PUSPA. *Alæ suprà* maris *azureæ fusco marginatæ, disco albo;* fœminæ *pallidiores disco cinerascenti-fusco: subtus sericeo-albæ, strigis duabus marginalibus serie punctorum intermediâ fasciâque maculari discoideâ fuscis; posticæ ocellulis pluribus basilaribus nigris albo cinctis duobus margini exteriore approximatis, apicali insigniore.* (Exp. alar. 1 unc. 1—4 lin.)

Wings above blue with a defined border of blackish brown, and a large white patch on the disk: in the *male* a deeper tint extends from the base to the edge of the brown margin, varying according to the direction of the light, being either intensely azure or diluted, and transmitting a ground colour of brown; in the *female* the blue colour is confined to the base. *Underneath*

the

the *wings* are white with a blueish cast; they have, on both pairs, along the posterior margins, two parallel brown strigæ, of which the interior is undulated, enclosing an interrupted series of oblong brown spots, gradually assuming a deeper tint as they approach the anal angle: interior of this follows a macular band, originating by two successive ocellate dots, from the margin of the fore wings and extending in an irregular curve through both pair: the disk of the fore wings bears a short curved streak, and a similar angular mark, but more obscure, stands on the hinder wings: the latter are further marked, in their basal portion, with numerous black ocellate spots bordered with white, of which five are more prominent; two of these stand near the exterior margin, the apical one being larger and of a more florid tint; two, less conspicuous, are disposed near the anal interior margin, and a fifth intermediate not far from the base. *Antennæ* annulated with white. Tufts of grayish blue hairs at the sides of the *thorax* and *abdomen*.

This species is abundant. About twenty specimens are contained in the collection. It appears to be the representative of the *Lycæna Arion*, in the eastern tropical regions. Among Indian species which have recently been added to our systematic catalogues, it most nearly resembles the *Pol. Duponchellii*, from Timor, described by MM. Latreille and Godart in the Encyclopédie: but it differs by the deep azure tint diffused over its upper surface, and by the number and arrangement of the ocellated spots underneath. It forms a natural transition, by its marks and habit to the next following genus.

Genus LYCÆNA.

Papilionis—Plebeiorum ruralium—species. *Linn.* Polyommati species. *Latr.* Lycæna. *Stephens.* Lycænæ species. *Fab.* Papiliones, Fam. M. Larvæ oblongoscutatæ. *Wiener Verzeichnis*, 180. Les Bronzés. *Geoffr.* Coppers. *Haworth.*

Character. *Larva* oblongoscutata, oblongior quam in cæteris generibus hujus stirpis, lateribus quasi impressa; plerumque pallide viridis, nuda aut pilis brevissimis tenerrimis tecta; capite brunneo aut pallescente.

Chrysalis antice posticeque admodum obtusa, fuscescens. (Tab. iv. fig. 1; 1, a.)

Imago: Antennæ filiformes, articulis intermediis longioribus, capitulo ovali subrefracto, sæpius compresso vel compresso-concavo marginibus subinvolutis.

Palpi capite longiores, parum porrecti, subassurgentes, articulis basilari et intermedio squamis villisque elongatis tectis, secundo elongato ultra medium capite soluto, tertio gracili attenuato nudo.

Proboscis palpis circa duplò longior.

Caput latiusculum. *Oculi* prominuli. *Corpus* gracile, compressum. *Alæ* anticæ subelongatæ angustæ, posticæ ad angulum analem productæ vel caudatæ; caudâ subfiliformi, in pluribus brevi, abrupto: subtus sæpius strigâ marginali aut maculis contiguis aurantiacis præditæ. *Pedes* omnes tarsis quinque; *femora* eadem quæ Polyommato; *tarsi* anticorum maris attenuati ungue solitario, vel interdum setâ corneâ terminali, spinisque rigidis accessoriis lateralibus; fœminæ semper unguibus duobus arcuatis villis brevibus interpositis. *Ungues* et *pulvilli* posticorum parvi.

Character. *Larva* more oblong than in the other genera of this stirps, hence named *oblongo-scutata*—elevated along the back, but laterally compressed, generally of a pale-green colour, naked or covered with very short delicate hair; head brown or yellowish. *Chrysalis* obtuse at both

both extremities, of a brown colour. *Antennæ* filiform, of moderate length, straight to the origin of the club, where they are rather suddenly refracted or bent outward; joints, short and gradually thickening at the base and apex, slender and elongated in the middle; club ovate compressed, or grooved with slightly involuted margins. *Palpi* longer than the head, slightly porrected; basal joint and posterior part of the intermediate joint closely applied to the head, anterior part of the latter and third joint bent upwards; basal and intermediate joints covered solely with minute scales and lengthened hair; third joint short, slender, attenuated, and naked. *Proboscis* nearly double the length of the palpi, but varying in different species. *Head* rather broad. *Eyes* large and prominent. *Body* slender, compressed. *Wings: anterior,* rather elongated and narrow, bounded by a regularly defined posterior margin; *posterior wings* somewhat lengthened at the anal angle, (and dentated) or provided with short, filiform, abruptly terminated tails. *Feet* invariably perfect in all parts. (In the Wiener Verzeichnis, the anterior feet are described as somewhat reduced in size.) The *tarsi* of the fore legs, in the male, are attenuated, and terminated by a a single claw, or by a corneous bristle, which is met at each side by a series of acute spines; in the female there are two strongly curved claws partly concealed by tufts of hair. The spine arising from the thighs of the mid-legs and the general character of these, as well as of the claws and pulvilli, are the same as in *Polyommatus.*

This genus is illustrated, on the second plate, by the dissections of the *Lycæna Roxus;* fig. 4; 4, a; 4, b; 4, c; 4, d; 4, e; 4, f; and on the fourth plate by those of the *Lycæna Elpis;* fig. 1, b; 1, c; 1, d; 1, e. The larva and chrysalis of *Lycæna Ælianus* are also represented on the fourth plate; fig. 1; 1, a.

It appears from a review of the generic characters of *Polyommatus* and *Lycæna,* that, if my views are correct, the distinction depends primarily on the variation of the metamorphosis; the larva, in the former, being regularly rounded or cylindrico-gibbous, in the latter more oblong and impressed at the sides: of the latter the Javanese Collection contains one example; I have been less successful in the discovery of the former. Although our acquaintance with the metamorphosis of the subjects belonging to the two genera now described, is still very imperfect, enough is known to confirm us in the expectation of finally obtaining a natural arrangement, which can only be accomplished by a knowledge of the entire history of these animals. In the antennæ and palpi of these two genera, no tangible difference can be pointed out. The distinction derived from the wings is more decisive; in each of the genera these organs have a peculiarity of habit, which, though not easily described in words, is readily seized by an experienced eye. The Blues are altogether without tails, and their character is well preserved in the Oriental tropical regions, but it is remarkable that in this part of the world, as far as I have observed, no true Coppers have been discovered, which in Europe chiefly constitute the genus *Lycæna.* The feet and claws of *Polyommatus* and *Lycæna* have not, as yet, been examined and described with the accuracy and minuteness which they require, and I offer with diffidence the modifications which I have proposed, in the characters of these genera, to the candid consideration of Entomologists. They are founded chiefly on the examination of *Pol. Puspa* and of *Lycænæ Roxus* and *Elpis:* of all these, numerous specimens have been submitted to repeated microscopical observations, the result of which is that in the *male* the tarsi are attenuated to a point, provided at the sides with rigid bristles, and terminated by a single claw, or by an obscure corneous spine; while in the *female* the last joint of the tarsus is uniformly broad, and the claws are partially concealed by lateral tufts of hair; when these are removed, two short claws become apparent, which are strongly curved.

In all the Indian species of *Lycæna* contained in our collection the posterior wings are entire, and they are provided with short filiform tails, agreeing with the division D. β. established by MM. Latreille and

Godart,

Godart, in the genus Polyommatus. (*Enc. Méth. Hist. Nat. ix, p.* 653.) They may be subdivided by artificial characters, into the following groups.

* *Wings underneath with simple ocellate spots ; anal ocelli without metallic irrorations.*

4. Lycæna Malaya. *Alæ suprà fuscæ plagâ albâ maximâ medianâ discoideâ : subtus sericeo-albæ, singulæ ad marginem posticum strigis duabus fuscis parallellis undulatis serie macularum intermediâ, pone medium fasciâ arcuatâ in posticis submaculari ; anticæ punctis quatuor minimis fuscis costæ parallelis ; posticæ punctis quinque aterrimis duobus majoribus guttæformibus altero apicali altero anali tribusque minoribus basilaribus in serie transversâ.* Exp. alar. 11 lin.

Wings above blackish brown, with a large white central area, extending obliquely from the middle of the fore to the disk of the hinder wings: colour more intense on the fore wings, the posterior margins of which are surrounded with a delicate white fringe, which is continued along the inner border of the hinder wings, by a series of elongated silky hairs: *tails* black, tipt with white: *underneath* the *wings* are pure satin white; anterior wings, near the costa, marked with four regular, equi-distant, minute brown dots, and on the disk, with a short curved line: towards the posterior margin follows a curved striga, consisting of short lineolæ or arcs, not touching each other, but disposed obliquely between the nervures; then, parallel with the margin, two narrow strigæ, the interior one being undulated, including a series of oblong, attenuated, dark brown spots: these strigæ and dots are continued uniformly through the hinder wings to the anal region; anterior to these is an interrupted macular fascia, resembling the curved band of the fore wings, but with broader lineolæ; then a short, transverse, discoidal arc: the hinder wings are further marked beneath with five intensely black spots, two marginal and three basal; the former are large, regularly round, of an intense black tint, one is placed near the outer, the other near the inner apical angle, opposite to the caudal appendage, being separated from the anal angle by two small dots: near the base are three transversely disposed equi-distant dots of an intensely black tint.

This species is comparatively scarce; two specimens only are contained in our collection. In its habit and markings it greatly resembles the individuals of the genus *Polyommatus,* and particularly the species last enumerated.

** *Anterior wings underneath with an elongated oblique fascia at the base; posterior wings, in most cases, with metallic irrorations on the ocellate spots in the anal region.*

5. Lycæna Roxus. *Alæ suprà nigræ, vittâ obliquâ latissimâ albicante margine exteriore sinuato: subtùs albæ, fasciis tribus nigris, primâ continuâ obliquâ basilari, secundâ interruptâ submaculari pone discum, tertiâ marginali, in anticis continuâ serie macularum albarum fretâ, in posticis lunulis nigris margini parallelis efformatâ.* Exp. alar. 1 unc.—1 unc. lin. 3.

Plate II. Fig. 4; 4, a, b, c, d, e, and f.

Polyommatus Roxus. Latreille and Godart, Encycl. Méthod. Hist. Nat. ix. p. 659. The male.

Wings above blackish brown, with a very broad band of yellowish white, situated on the posterior edge, arising on the disk of the anterior, and passing obliquely over the disk and base of the posterior pair; marginal fringe grayish: *underneath* the *wings* are white, inclining to pale yellow,

low, with a broad fascia of blackish-brown, extending from the middle of the costa of the fore wings obliquely over the base of the hinder wings to the thorax; at the point where it meets the costa commences a curved, irregularly interrupted macular fascia, consisting of diversified spots and patches of blackish-brown; exterior to this is on the fore wings a narrow brown margin, regularly waving at its inner edge, bearing a row of oblong yellowish spots, which is continued in the hinder wings by a series of uniform lunulæ directed outwards, touching a narrow black marginal streak and inclosing a series of white lineolæ. *Head, thorax,* and *body,* deep blackish-brown above, yellowish underneath; *abdomen* banded with yellow at the sides: *antennæ* marked with delicate annuli. *Tails* filiform, black, tipt with white. In the *female* the transverse band of the fore-wings approaches nearer to the costa than in the male, its posterior edge is more deeply sinuated, and the hinder wings have an interrupted row of obscure yellowish lineolæ, parallel with the margin: the wings, in this sex, are also broader and more expanded, and the abdomen is more robust.

The first notice of this species is given by MM. Latreille and Godart, in Encyclop. Méthod. article Papillon, p. 659. Male specimens only had been examined by these authors. Hitherto this species has only been found in Java: it occurs, in considerable numbers, in the skirts of large forests; but from the great delicacy of the wings it is not easily obtained in a perfect state. Our collection contains about sixteen specimens, several of which are females. One of the latter is represented on our plate. This species departs slightly from the regular type: the wings are proportionally narrow and of great lateral expansion: in its habit and marking it is analogous to the genus *Nymphidium* of Fabricius, but it cannot, in our opinion, be separated from *Lycæna.* The dissection contained in our second plate was prepared by Mr. Charles Curtis with great care from a male, and affords an illustration of this particular form in the genus *Lycæna.* Fig. 4 and 4, a, exhibit the exterior peculiarities of the female; fig. 4, b, *palpi* of natural size and enlarged; 4, c, *antennæ* of natural size, and with the extremity enlarged to show the excavation of the club; 4, d, *proboscis* male of natural size: the latter as well as the antennæ and palpi are alike in both sexes; 4, e, *fore leg* of the male; 4, f, *mid leg,* with the spinous process of the femur.

6. Lycæna Rosimon. *Alæ utrinquè albæ maculis sparsis margineque omni nigris: subtùs vittis et maculis basilaribus fasciisque marginalibus macularibus nigris; singulæ insuper suprà ad basin cæruleo-argenteæ, posticæ subtùs maculis tribus anguli ani argenteis.* (Exp. alar. 1 unc. 1 lin. —1 unc. 3 lin.)

Papilio P. R. Rosimon. Fab. Mant. Ins. tom. 2. p. 71. No. 672.

Papilio Coridon. Cram. pl. 340. fig. C. D. E.

Polyommatus Rosimon. Latr. and Godt. Enc. Méth. Hist. Nat. ix. 2. p. 658.

Wings above white, with a grayish-blue base, over which a brilliant silvery irroration, varying according to the light, is thinly spread; anterior margin of both wings blackish-brown, a border of the same colour passing along the posterior margins, broader on the hinder wings, indented at the inner edge, and bearing a regular series of white rings formed by crescents applied to each other, the exterior being in many cases so obscure, that merely a series of lunules directed outwards is apparent: a very irregular series of square or oblong maculæ passes along the inner edge of the marginal border, and several maculæ, more elongated, are scattered over the disk and along the anterior margin of both wings. *Beneath* the *wings* are white; in the anterior wings an oblique band of black extends from the base to the anterior margin, the interrupted macular fascia and the transverse marks of the disk and anterior margins appear more prominently

nently on the lower surface; and parallel with the posterior margin extend three rows of small oblong spots, of which three, in the posterior series, near the anal angle, are covered with a blueish-silvery irroration. *Head*, *body*, and *abdomen*, black above and white underneath, the latter banded at the sides: *antennæ* with white annuli. The *female* is of larger size, the posterior border is broader, and the black colour is more intense.

This species extends through the southern regions of Asia and through the Eastern Islands. It is abundant in Java, more than twelve specimens being contained in our collection. There are also individuals from the continent of India in the Honourable Company's museum. It is found in Timor, according to the notice of MM. Latreille and Godart: and Cramer mentions the coast of Coromandel as well as the Cape of Good Hope as its habitation. The Banksian cabinet of Insects, preserved at the Linnean Society of London, contains two individuals of *Lycæna Rosimon*, labelled by Fabricius himself; and the collection of Mr. Haworth is likewise provided with several specimens.

7. Lycæna Plinius. *Alæ suprà* maris *violaceæ nitore rubescente*, fœminæ *albentes, limbo fusco in posticis ocellato, disco maculis oblongis nigris, basi cœruleo irroratâ: subtùs albæ strigis duabus margini postico parallelis serie punctorum intermediâ; anticæ fasciis fuscis oblique-transversis vel dimidiatis repandis oblongis vel attenuatis maculâque subrotundâ discoideâ; posticæ regione anali maculis duabus viridi-argenteo irroratis, basi discoque omni maculis pluribus difformibus fasciâque exteriore margine postico radiatâ.* (Exp. alar. 1 unc.—13 lin.)

Hesperia R. Plinius. Fab. Ent. Syst. em. tom. 3. pars. 1. p. 284. No. 92.

Papilio Plinius. Donov. Ind. Ins. (with a figure).

Polyommatus Plinius. MM. Latr. and Godt. Enc. Méth. Hist. Nat. ix. 658.

Wings above, in the male, pale violet blue, with a purple reflexion, surrounded by a very delicate brown border fringed with white; *beneath* both *wings* are white and variegated *(panachées)* with oblique transverse or semi-transverse bands irregularly sinuated at their edges, oblong or tapering, of unequal breadth, and arranged in the following succession: at the base a broad longitudinal band extends with a slight obliquity to the middle of the costa; between this and the interior margin is a triangular mark, and before this a transverse mark gradually attenuated towards the costa; an obscure evanescent band next extends from the exterior margin to the disk, and immediately exterior to this, a prominent band gradually increasing in breadth and terminated by a short point, passes over the disk; the band next in order is short, and near its termination a nearly circular or oblong spot is placed; two obliquely transverse bands now extend from the costa half across the wing, the first being oblong, the other attenuated or pyramidal: the posterior margin is bounded by two regularly continued strigæ, the anterior of which is broader and slightly waving, enclosing a series of oblong marks; these are continued uniformly through the hinder wings to the anal region, where the two last are of a deep black tint, with a yellowish iris, and covered with greenish resplendent irrorations; to the last a very minute black spot at the extreme anal angle is applied: the marginal spot in the anterior apical angle is more pronounced than the rest. The disk and base of the posterior wings are variegated with very irregular oblong marks, with sinuated margins, tranversely arranged, the posterior one being most conspicuous and decorated with acute radiant points directed to the margin. The *tails* are very slender and grayish at the base; the *antennæ* and *abdomen* banded. The female agrees with the male in the disposition of the marks underneath, but the surface is whiter,

whiter, the bands are more intensely coloured, and their edges more regularly defined. In the upper surface this sex greatly resembles *L. Rosimon*: the borders of the wings throughout are brown, bearing in the hinder wings a series of ocellate spots; the surfaces of both pairs are covered with transverse patches, and the blue tint, which is purely azure, is confined to the base.

Our Collection contains two males and one female of this species in high perfection. In the female the radiated band in the hinder wings is less distinct, but the marks generally are more pronounced. In the upper surface this species is with difficulty distinguished from *L. Rosimon*. The comparison of two female specimens contained in Mr. Haworth's collection, and of one preserved in the Banksian cabinet, has enabled me to illustrate, in some measure, by an intricate description this hitherto imperfectly known species. In our specimens the transverse bands are more interrupted than they appear in Donovan's figure. Several other species, enumerated by systematic writers, belong to this small group, which is also found at the Cape of Good Hope and in Brazil: the *Papilio Lingeus* of Cramer is from the former, and Mr. Haworth has one or more species from the latter country.

8. Lycæna Theophrastus. *Alæ suprà* maris *cœrulescenti-violaceæ limbo fusco;* fœminæ *singulæ basi cœrulescentes, anticæ disco atro maculato, posticæ serie macularum albarum ocellorumque margini postico parallelâ: subtùs albæ strigis plurimis macularibus atris; posticæ insuper ocellis quinque macularibus aureis, penultimo puncto nigro freto, anali didymo.* (Exp. alar. 1 unc. 1 lin. fœminæ.)

Hesperia R. Theophrastus. Fab. Ent. Syst. em. tom. 3. pars. 1. p. 281. No. 82. (The female.)

Polyommatus Theophrastus. Latr. et Godt. Enc. Méth. Hist. Nat. ix. p. 658.

Fabricius has described the female only, but in the Encyclopédie we have a delineation of the male also. I have not examined the latter sex. The museum at the India-House contains a single female specimen, derived from Dr. Russel, whose brother Claude Russell presented the result of his Entomological researches to the Honourable Company; it was probably from the coast of the Mediterranean. I have not found it in Java. Mr. Haworth possesses two female specimens. In its upper surface it greatly resembles *L. Rosimon* and *Plinius;* the disk of the fore wings is strikingly marked with quadrangular black spots, the hinder wings bear a continued series of white spots, and beyond that, a series of brown ocelli, parallel with the hinder margin. This species is most clearly distinguished from the others belonging to this group, by a series of ocellate spots, covered with aureous irrorations, along the posterior border of the hinder wings underneath, of which the anal one is reniform or double, and the adjoining ocellus marked with a pronounced black dot.

*** *Three continued strigæ parallel with the posterior margin passing uniformly through all the wings underneath; hinder wings further marked with six, rarely seven, successive parallel strigæ, and with three anal ocelli, the posterior one large and regularly orbicular, the second transverse and reniform, the third at the extreme anal angle, small and obscure; the large ocellus bordered internally with an orange or rufous lunule, and externally with a silvery streak, the other ocelli united at their inner edge by irrorations and a rufous band.*

9. Lycæna Ælianus. *Alæ suprà lacteæ limbo postico fusco: subtùs canescenti-fuscæ albo strigosæ; strigis tribus continuis ad marginem posticum; anticæ insuper strigis quatuor in disco paral-*

parallelis posticè interruptis, in paribus duobus interiore abbreviato punctis tribus costæ interjectis; posticæ strigis sex, paribus primo basilari, secundo discoideo, tertio submarginali, intervallis strigarum interdum saturatioribus ; ocellis analibus tribus, exteriore maximo iride angusto annulari, secundo subreniformi, interiore minimo absque iride. (Expans. alar. 1 unc. 2—6 lin.)

Plate iv. fig. 1, Larva; fig. 1, a. Pupa.

Hesperia R. Ælianus. Fab. Ent. Syst. em. tom. 3. pars. 1. p. 280. No. 79 ?
Papilio Alexis. Stoll Suppl. à Cram. pl. 38. fig. 3 and 3, c.
Polyommatus Ælianus. Latr. and Godt. Enc. Méth. Nat. Hist. ix. p. 654.

Wings above, in both sexes milk-white; in the *male* the *anterior wings* have a narrow brown posterior border, the *hinder wings* are surrounded by a delicate black striga, interior to which is an obscure interrupted brown band, in which the large ocellate spot at the anal angle distinctly shows itself; in the *female* the *wings* have a broad brown border, which in the *fore wings* is simple and more extended near the tip, in the *hinder wings* waving internally and bearing a series of brown spots of a deeper tint towards the anal extremity; these spots are enclosed individually by two white crescents applied to each other from the opposite sides and forming a white ring, exterior to which is a deep brown marginal streak, terminated by a grayish-brown fringe. *Wings underneath* grayish-brown, varying in intensity of tint: *anterior wings* with seven, *posterior wings* with nine, transverse white strigæ, of which three are marginal, extending uniformly through both pairs: the remaining strigæ in the anterior wings are discoidal, regularly parallel, with a slight inclination to the posterior apical angle, arranged in two pairs, the first, on the disk, short and separated from the costa by three dots, disposed as the points of a triangle; the second extending nearly half across the wing, each with a dot at its contact with the costa slightly deviating from the regular course. On reaching the middle of the wing these strigæ are all abruptly terminated at one of the longitudinal nerves, and each pair is continued by a single streak to the posterior margin; in consequence the strigæ appear divided, resembling in some cases two successive figures of the form of the letter Y. The posterior portions of the strigæ have undefined, spreading edges, and in many individuals the whole of the posterior portion of the wing is milky and discoloured. Of the three marginal strigæ, the interior is broadest and most prominent; reaching the posterior part of the wing, its inner edge expands in a diffuse radiant border, gradually mingling itself with the clouded milky surface; the intermediate one is undulating, and composed of a connected series of lunules directed outward; the exterior striga is continued, regular, parallel with the margin, and exteriorly defined by a narrow black line, beyond which is a grayish fringe: these marginal strigæ preserve in the *hinder wings* the same character, until they are partially interrupted in the anal region; the surface of these wings is further marked with six transverse strigæ, disposed in three pairs, one near the base, a second across the disk, a third intermediate between this and the marginal ones; the basal strigæ are delicate and regularly transverse, with a slight curve at the interior margin; the discoidal pair is not continued quite to the exterior margin, but has, at its commencement, a short intermediate lineola; at the interior margin it is inflected inwards, so as to form, abruptly, an acute angle; the third pair extends only half across the wing, having a short intermediate lineola at its posterior termination. In both wings the ground colour assumes, in some individuals, between the transverse strigæ a deeper tint, so that these appear to be marked with broad, transverse, brown bands: but this is by no means uniform: some of our specimens have these brown bands very distinct, in others,

equally

equally well preserved, the ground colour is uniform, and the white transverse strigæ preserve the character above described. In the anal region there are three ocellated spots; the largest, situated on the posterior margin just without the caudal appendage, is ovate, bounded internally by a narrow orange crescent, and externally by a streak covered with greenish silvery irrorations; at its internal edge is a reniform spot, intensely black towards the anal angle, surmounted by a silvery lunule and a small orange crescent, aud touching at the extreme anal angle a minute, dark coloured, blind ocellus: the *tails* are lenthened, slender, brown above, and white underneath and at the extremity. The *antennæ* are black and regularly fasciated with white externally; the *body* pale blue above, white underneath. The *larva* and *pupa* are figured on our fourth plate: the former feeds on the *Butea frondosa*, and was observed in the month of February: numerous specimens of the perfect insect in high perfection, bred from the larva, are contained in our collection. This species, according to the authors of the article Papillon in the Encyclopédie, is also found in Timor. Stoll mentions, perhaps erroneously, Surinam as the native place.

10. Lycæna Celerio. *Alæ suprà* maris *azureæ nitore argenteo*, fœminæ *dilutiores nitore canescente, limbo latissimo nigro posticorum strigis tribus undulatis albis: subtùs canescenti-fuscæ albo strigosæ, strigis tribus marginalibus continuis; anticæ insuper strigis quatuor mediis imparibus, duabus interioribus costam non attingentibus singulis puncto interjecto, secundâ brevissimâ quartâ dimidiatâ; posticæ strigis sex, duabus basilaribus completis, duabus mediis ad angulum analem inflexis, duabus submarginalibus posticè abbreviatis; ocellis analibus tribus posteriore insigniore in tæniâ aurantio-fuscâ latissimâ nidulante.* (Expans. alar. 1 unc. 3—5 lin.)

Papilio P. R. Celerio. Fab. Mant. Ins. tom. 2. p. 66. No. 625?

Papilio Celeno. Cram. pl. 31. fig. c. d. (the male.)

Polyommatus Celerio. Enc. Méth. Hist. Nat. ix. p. 654.

Wings above in the *male*, azure with a whitish silvery reflexion; *anterior wings* with a narrow blackish border along the posterior margin, gradually spreading and more intensely coloured at the outer apical angle: the *posterior wings* have a delicate black marginal striga, narrowly bordered with white along its internal edge, and, at the anal angle, interior to this, between the caudal appendage and internal margin, a short undulated fascia of black: in the *female* the azure tint is paler, shaded into brownish, and the wings have a broad brown posterior border, which in the hinder pair is crossed by three white strigæ parallel with the margin, the outer being regular and continued, the next formed of crescents directed outward, the third undulated: the surface of the *wings underneath* is grayish brown with a rich silvery gloss, bearing *seven* strigæ in the anterior and *nine* in the posterior pair, of which three are marginal and continued through both; the *anterior wings* have besides, between the basal portion which is plain, and the margin, four strigæ of unequal length; the first and second arise at a small distance from the costa, and two minute white dots, respectively opposed to each, stand in the intermediate space; the first striga passes across the surface to the interior margin, the second is short and terminates exactly on the disk; the third is united to the costa by a dot obliquely applied and extends entirely over the wing; the fourth arises from the costa, and is regularly continued half across the surface: in the *posterior wings* the strigæ are regularly disposed in

 pairs,

pairs, two are basal more delicate than the others, reaching entirely across the wing and slightly inflected at the interior margin; the two next arise parallel to each other from the costa, pass regularly across the disk and have a sudden angular inflexion inwards at the anal region, the two following are somewhat broader, of a more vivid tint and terminate abruptly at the anal ocelli, the exterior one being somewhat abbreviated. The anal region is ornamented with three black spots; the largest, in the posterior margin, without the caudal appendage, is oblong, of a very intense tint, disposed in a very broad rufous-orange crescent indented along its inner curve: within it is a transverse reniform mark, the interior portion of which is more deeply coloured, supplied with an orange crescent, and placed in contact with a small blind ocellus at the extreme anal angle: the intermediate ocellus has internally and the large one externally, a few silvery irrorations disposed in a short line. The *antennæ* are rather obscurely banded along their internal surface, the *body* agrees above in colour with the wings and the *abdomen* is laterally banded.

11. Lycæna Elpis. *Alæ suprà dilutè azureæ,* fœminæ *limbo latissimo nigro, posticarum strigis tribus fuscis intermediâ maculari: subtùs canescenti-fuscæ albo strigosæ, strigis tribus margini postico parallelis; anticæ insuper strigis quatuor mediis in paribus duobus, interiore continuo intervallo brevi ab margine exteriore incipiente, arcuato-angulato ad marginem interiorem ducto, pari exteriore ex lineolis interruptis efformato, costam attingente, dimidiato, in disco impari terminato; ocelli anales tres, posteriore maximo iride latissimâ trifidâ, posticè tæniâ argenteo irroratâ, intermedio transverso oblongo-reniformi lobo exteriore obscuro altero saturato, ocello interiore parvo punctulari sæpius plicâ alari recondito.* (Exp. alar. 1 unc. 2—8 lin.)

Plate 1, fig. 4.

Polyommatus Elpis. Latr. and Godt. Enc. Méth. Hist. Nat. ix. 654.

Wings above, in the *male,* pale azure with a silvery somewhat lactescent gloss; *anterior wings* with a narrow blackish-brown posterior margin; *hinder wings* with a broader border of the same colour, consisting of three parallel strigæ, one exterior narrow and continued; the second intermediate, composed of a series of oblong spots more intensely coloured towards the anal angle; the third and interior one broad, waving and evanescent: in the *female* the azure tint is somewhat diluted; the *anterior wings* have a very broad dark brown posterior border, stretching obliquely to the middle of the costa, in the *posterior wings* the border has a blackish tint, and the oblong spots of the intermediate series are encircled with white. *Underneath* the surface of both wings is grayish-brown, and in well preserved individuals the tint is deeper, and a rich silvery reflexion is spread over it; the *anterior wings* have seven, and the *posterior* ones nine white strigæ, three of which are marginal and agree with those of the two former species; on the medial and submarginal portion of the *anterior wings,* are four white strigæ arranged in two pairs; the strigæ of the interior pair are continued, they arise, parallel to each other, at a small distance from the costa, pass in a somewhat angular curve across the disk, and come in contact with the interior margin near the inner one of the marginal strigæ: the next pair consists of interrupted short linear fragments, arises from the costa, having near its point of contact two or three small lateral dots, stretches half across the wing, and is terminated on the disk by a short lineola, disposed intermediately between the two or along the interior striga. The

The arrangement of these strigæ is permanent and affords clear characters for a specific distinction. The *hinder wings* are marked between the base and margin with six transverse strigæ, agreeing generally with those of the two last described species *Ælianus* and *Celerio*, the only apparent difference is that they are somewhat broken and interrupted in their course. The *anal ocelli* are not in any degree different from those of *L. Celerio.* The *thorax* and anterior part of the *abdomen* are covered with a grayish or light blue and silvery down: the sides of the abdomen and the *antennæ* are annulated.

Our collection contains one specimen of a variety on which a pure azure extends uniformly over the upper surface.

12. Lycæna Pavana. *Alæ suprà* maris *violaceo-cœruleæ argenteo submicantes,* fœminæ *saturatiores marginibus exteriore et posteriore fuscis: subtùs canescenti-fuscæ albo strigosæ, strigis tribus continuis ad marginem posticum; anticæ insuper in dimidio anteriore strigis quatuor parallelis, pari interiore punctis duobus costæ interjectis; posticæ strigis septem æquidistantibus interruptis basilari obscurâ; ocellis analibus tribus exteriore maximo iride angustâ rufâ posticè viridi argenteo irroratâ.* (Exp. alar. 1 unc.)

Wings above, in the *male,* pale violet-blue, which tint being almost equally diffused over a grayish, brown ground, has, in a certain position, a pale silvery reflexion; margin terminated by a very narrow brown thread and a grayish fringe; in the *female* a defined brown border extends along the exterior and posterior margins of the *anterior* wings, on the base and disk the violet colour is deeper than in the male, and the silvery gloss is more intense; the *hinder wings* have a series of dark brown spots parallel with the posterior margin, of which the penultimate one, opposite the caudal appendage, has a deeper tint: these spots are bounded exteriorly by an intense white thread, and interiorly by a series of obscure lunules directed outward. *Underneath* the *wings* are grayish brown with a pale silvery reflexion, the *anterior pair* having seven, the *posterior* pair ten white strigæ, of which three are marginal, continued uniformly through both pairs to the anal ocelli, and bounded exteriorly by a deep black thread. On the *anterior wings* the medial portion is marked by two pairs of strigæ, extending half across the surface, being here terminated abruptly at one of the longitudinal nerves; their direction is regularly transverse and they are slightly undulated; the interior pair is short, and arises at a small distance from the costa; in the intermediate space a small dot is regularly opposed to each striga; the second pair touches the costa and reaches regularly to the disk; in the posterior portion of the surface one striga opposed to each of these pairs, is continued parallel with the other to the interior margin. In the *hinder wings,* the strigæ, seven in number, are not arranged in pairs, but follow nearly at equal distances, broken and interrupted by obscurer lines, without any curve in the anal region: the basal one is minute, close to the thorax, and in some individuals very obscure. Three ocellated spots of an intense black colour, but very unequal in size, are placed in the anal angle at the posterior margin; the exterior one is very large, regularly orbicular, bounded interiorly, and at the sides by a very narrow yellowish brown iris, and exteriorly by a crescent of silvery irrorations; adjoining to this is an excavated irregularly reniform spot, which touches a minute ocellus at the extremity of the anal angle; the intermediate spot is marked interiorly with silvery irrorations and a rufous crescent, and the extreme ocellus is also slightly spangled. The *tails* are brown, tipt with white; the *body,* brown above, and white underneath; the *antennæ* brown, very obscurely banded with gray.

13. Lycæna Atratus. *Alæ suprà* fœminæ *violaceo-azureæ; anticæ disco albente marginibusque latè nigricantibus; posticæ ad marginem serie punctorum nigrorum strigisque alternis albis et fuscis: subtùs fuscæ albo strigosæ, strigis tribus continuis ad marginem posticum; anticæ insuper strigis sex marginem non attingentibus, quartâ et sextâ brevioribus, punctis quatuor in serie costæ interjectis; posticæ strigis septem interruptis, lineolis alternè intermediis, ocellis analibus tribus.* (Exp. alar 1 unc. 3 lin.)

Papilio Atratus. Cram. pl. 365. fig. A. B.?

Wings above, in the female, shaded with violet-blue from the base towards the margin, on a brownish ground transmitting a white patch on the disk; exterior and posterior margins of the *fore wings*, dark blackish brown; *hinder wings* along the posterior margin marked with a series of oblong brown spots, enclosed by two undulated white threads, the interior one being bounded by a deep brown fascia, and the exterior one by a blackish margin fringed with grayish brown. *Wings underneath* brown, with a shade of silvery gray; *anterior* with nine, *posterior* with ten white strigæ, three of which are marginal extending uniformly through both pairs; in the *anterior* wings these strigæ follow each other, after nearly equal intervals, from a small vacancy at the base to the marginal series; they do not arise in contact with the costa, but a small intervening space is occupied by four marginal dots, in irregular succession, of which the two posterior ones are most distinct; the first three interior strigæ are parallel and nearly regularly transverse; the fourth is very short; the fifth extends across the surface with a slight obliquity inwards; the sixth terminates in the middle of the surface: in the *posterior wings*, seven transverse strigæ occupy the whole surface to the marginal series; the basal one is short and obscure, the remaining are broken, and a short lineola is placed in some cases, intermediately between the successive strigæ; they have a very slight curve towards the anterior margin: there are three anal ocelli, agreeing in character with those of the last described species; one exterior, near the margin large and regularly orbicular; the next reniform, with a more saturated tint at the lobe which touches the interior ocellus situated at the extreme anal angle, and more pronounced than in the allied species; the two anterior ocelli are connected by a short streak of silvery irrorations covering their inner border, and bounded by a short rufous fascia. The *antennæ* and *abdomen* are obscurely banded with white: the *thorax* and the *body* anteriorly are covered with gray hair.

14. Lycæna Nila. *Alæ suprà* maris *cyaneæ, vel pro vario ad lucem objectu thalassino relucentes, nitidissimæ; anticæ limbo lato, posticæ strigâ marginali nigrâ: subtùs flavido canescentes strigis tenuissimis albidis pallidè aureis, tribus posticis continuis margini parallelis; anticæ insuper strigis quatuor in paribus duobus ordinatis, anteriore brevissimo imo disco sito altero submarginali ex lineolis interruptis subflexuosim transversè ducto, dimidio posteriore infracto anticum versus spectante; posticæ strigis sex in paribus tribus, primo subbasilari altero mediano tertio submarginali, omnibus ex lineolis parallelis interruptis efformatis; ocelli anales tres nigerrimi, exteriore maximo orbiculari iride angustâ annulari rufâ posticè transversim terminatâ et tæniâ argenteo-irroratâ, intermedio reniformi lobo interiore saturatiore ocello interno approximato, horum margine interiore lunulâ irroratâ et denique tæniâ rufâ obducto.* (Exp. alar. 14 lin.)

Wings above, pure deep blue with a rich metallic lustre, changing according to the light to a brilliant sea-green; *anterior* wings with a broad black posterior border stretching towards the middle

middle of the costa; *posterior*, surrounded by an intensely black marginal thread; fringe of both pairs grayish brown, near the anal angle, at the caudal appendage a lunular-oblong black spot, bordered externally by an obscure white thread extending to the anal angle: *underneath* the wings are yellowish-brown with a straw-coloured shade and transversely marked, in the *fore wings* with seven, and in the *hinder wings* with nine very delicate yellowish strigæ covered with a faint golden lustre; three being marginal and continued through both pairs; the anterior wings are further marked, in the space comprised between the middle and the marginal series with two pairs of strigæ, one short consisting of two lines parallel to each other immediately on the disk, the other extending across the whole surface in an angular curve, composed of short lines somewhat flexuose between the longitudinal nerves, with a sudden inflection on the disk, by which the posterior portion is directed towards the short pair; viewed together as arranged on the wing, these strigæ exhibit a figure somewhat resembling the letter Y: the surface of the hinder wings bears also three pairs of strigæ; the first at a small distance from the base, the second in the middle stretching across the disk with a curve at the interior margin, the third posterior to this and terminated at the anal ocelli; they are individually composed of parallel interrupted portions; three ocellate spots are at the posterior margin near the anal angle; the exterior one large, nearly circular, abruptly terminated behind by a streak of silvery irrorations and surrounded interiorly and at the sides with a narrow rufous iris; intermediate ocellus reniform, of a most intense tint on the lobe touching the extreme ocellus, which is larger and more distinct than in the related species; the two last ocelli are united at their internal edge by a silvery lunule bordered with a rufous streak. *Tails* black, tipt with white; *antennæ* obscurely banded, *body*, blackish above, white underneath.

The species last enumerated is strikingly distinguished from all others belonging to this group, by the brilliant blue or sea-green tint on the upper surfacc: our collection contains two male specimens.

The species named *Lycæna Atratus*, although clearly distinct from the other species contained in this catalogue, and, agreeably to my examination, from all the individuals enumerated in the 9th volume of the Encyclopédie, cannot be identified with Cramer's figure of *P. Atratus*, without some uncertainty: it agrees with that species in the arrangement of the subcostal dots, which afford a permanent distinction in all the species of this section which I have examined, and in the direction and character of the strigæ of the forewings: but its final determination requires further comparisons. *P. Atratus* is cited in the Encyclopédie, as the female of *Pol. Celerio;* but since we have several individuals of both sexes of that species from Java, and since *P. Atratus* possesses various characteristic peculiarities, I have been reluctant to adopt that opinion.

Of *Lycæna Pavana*, a single pair, in perfect preservation, is contained in our museum; this species is readily distinguished by the regularly tranverse arrangement of the strigæ in both wings.

The species first enumerated in this section have required, on account of their near resemblance and similarity of upper surface, a more copious description than will generally be found necessary. *Ælianus* and *Celerio* are two original names of Fabricius; but his descriptions are not sufficient for the clear discrimination of the species at the present period. Some uncertainty therefore remains, as to the real application of these names, to the species contained in this catalogue, and I have consequently annexed a query. One specimen contained in thc Banksian cabinet, with the name of *Celerio,* in the hand-writing of Fabricius, belongs to *Ælianus* of this catalogue and of the Encyclopédie. I have been more minute in the description of *Lyc. Ælianus,* as it is subject to greater variations in the marks on which the specific distinction is founded, than either *Celerio* or *Elpis*. My observations on this species are chiefly founded

founded on specimens in high perfection, obtained by allowing the larva to undergo its change. At least twelve specimens are contained in the Honourable Company's museum. In the more simple specimens the underside of the wings is of an uniform grayish tint, through which the transverse strigæ are distributed; but there is a marked variety, in which the portion of surface included between the strigæ has a dark or brownish tint, and in this the wings appear as if marked with broad brown bands edged with narrow white threads. This is the character of the *Papilio Alexis* of Stoll, which is cited in the Encyc. Méth. as a Synonym of *Ælianus:* but in the specimens of this variety, which are contained in our collection, the character of the strigæ and of the submarginal dots agrees with the description above given; I have therefore considered it a mere variety, and the correctness of this conclusion remains for future examination.

Of *Lycæna Celerio* about ten specimens are contained in the Honourable Company's museum in a perfect state of preservation, but I did not succeed in discovering the larva.

Of *Lycæna Elpis* the collection contains at least fifteen specimens; it appears to be, on the whole, the most abundant of the three nearly related species. It is first named in the Enc. Méth., and described as a native of Java, but the authors were unacquainted with the female. It has not before been figured; the illustration given on our first plate is not quite satisfactory, and I shall endeavour to afford a comparative view of *Ælianus* and *Celerio* as now defined and described. The *anal ocelli* agree in all the species arranged in this section; the three strigæ parallel to the posterior margin extending through both wings, and the strigæ on the lower surface of the hinder pair having likewise the same character, with very slight modifications; and the species can only be clearly discriminated by the markings of the lower surface of the anterior wings, on which the specific character will eventually be founded.

**** *Wings underneath bearing undulated or catenulated marks, consisting of single or of compound parallel bands, of a more saturated tint than the ground colour, bounded by white marginal strigæ: posterior wings in many cases marked with prominent black dots; anal ocelli often two in number, and nearly of equal size.*

14. Lycæna Boetica. *Alæ supra* maris *pallidè violaceæ nitore in fuscum vergente limbo fusco; posticæ ocellulis analibus duobus nigris altero orbiculari altero oblongo angulum analem attingente;* fœminæ *fuscæ basi discoque argenteo irroratis, ocello anali postico saturatissimo iride sericeo-albâ insigni: subtus cinereo-flavicantes strigis tribus albis margini postico parallelis in posticis interiore latiore et vividiore; singulæ insuper strigis undulatis quinatim fasciculatis, strigâ intermediâ albâ proximis fuscis latioribus marginalibus tenuissimis albis; horum fasciculorum in anticis tres, duo in disco siti brevissimi, tertius submarginalis completus, in posticis duo completi insigniores, duo insùper abbreviati, ad basin et in disco intermedii: ocelli anales duo in tæniâ rufâ transversâ nidulantes exteriore orbiculari posticè lunulâ argenteâ cincto, altero oblongo puncto irrorato ad marginem posticum.* (Exp. alar. unc. 1.)

Papilio P. R. Boeticus. Linn. Syst. Nat. 2. p. 789. No. 226. The female.

Hesperia R. Boetica. Fab. Ent. Syst. em. tom. 3. p. 1. p. 280. No. 77.

Papilio Boeticus. Esp. Pap. tab. 27. Suppl. 3. fig. 3. a. b. p. 319—tab. 91. cont. 41. fig. 3. p. 181. Hubn. Pap. tab. 74. fig. 373. 374. mas. 375. fœm. Ochsenh. Pap. Eur. tom. 1. 2. p. 99.

Polyommatus Boeticus. MM. Latr. et Godt., Enc. Méth. Hist. Nat. ix. 653.

Wings above, in the male, dull violet blue on a brownish ground colour, with a narrow defined brown margin, and grayish fringe; *hinder wings*, bearing in contact with the posterior margin opposite to the caudal appendage, a regularly orbiculate black spot, an oval one notched at the

EXPLANATION OF THE PLATES.

PLATE I.

Fig.

1; 1, a. Polyommatus Akasa. H.
2; 2, a. Pithecops Hylax. Polyommatus Hylax. *Enc. Méth. Hist. Nat. ix.* 701.
3. ...... Thecla Epicles. Polyommatus Epicles. *Enc. Méth. Hist. Nat. ix.* 646.
4. ...... Lycæna Elpis. Polyommatus Elpis. *Enc. Méth. Hist. Nat. ix.* 654.
5. ...... Thecla Chitra. H.
6; 6, a. Thecla Vidura. H.
7. ...... Thecla Longinus. Hesperia R. Longinus. *Fabr.*
8. ...... Thecla Narada. H.
9. ...... Thecla Etolus. Hesperia R. Etolus. *Fabr.*
10; 10, a. Thecla Sugriva. H.
11; 11, a. Thecla Ravindra. H.
12. ...... Terias Hecabe. *Swainson.* Papilio Hecabe. *Linn.*
13. ...... Terias Drona. H.
14; 14, a. Papilio Arjuna. H.
15. ...... Papilio Nox. *Swains. Zool. Illust.*

PLATE II.

1; 1, a. Petavia Sakuni. H. Polyommatus Petavius. *Enc. Méth. Hist. Nat. ix.* 676. 1, b: Palpi. 1, c: Antennæ. 1, d: Proboscis. 1, e: Fore leg. 1, f: Hind leg.
2. ...... Symetha Pandu. H. Male. 2, a: Female. Polyommatus Symethus. *Enc. Méth. Hist. Nat. ix.* 675. 2, b: Palpi. 2, c: Antennæ. 2, d: Proboscis. 2, e: Fore leg of the male. 2, f: Fore leg of the female. 2, g: Mid leg. 2, h: Hind leg. 2, i: Lateral view of the abdomen of the male.
3. ...... Emesis Drupadi. H. Female: 3, a. Male. 3, b: Palpi. 3, c: Antennæ. 3, d: Proboscis. 3, e: Fore leg of the male, somewhat magnified, with the hair removed. 3, f: Fore leg of the male in its natural situation. 3, g: Fore leg of the female.
4; 4, a. Lycæna Roxus. Polyommatus Roxus. *Enc. Méth. Hist. Nat. ix.* 659. 4. Female. 4, b: Palpi. 4, c: Antennæ. 4, d: Proboscis. 4, e: Fore leg of the male. 4, f: Mid leg.
5; 5, a. Myrina Jaffra. *Enc. Méth. Hist. Nat. ix.* 593. 5, b: Palpi. 5, c: Antennæ. 5, d: Proboscis. 5, e: Fore leg.
6: 6, a. Myrina Atymnus. *Enc. Méth. Hist. Nat. ix.* 594. 6, b: Palpi. 6, c: Antennæ. 6, d: Proboscis. 6. e: Fore leg.

PLATE III.

1. Papilio Polites: Larva; 1, a: Chrysalis.
2. Papilio Pammon: Larva; 2, a: Chrysalis.
3. Papilio Memnon: Larva; 3, a: Chrysalis.
4. Papilio Cresphontes: Larva; 4, a: Chrysalis.
5. Papilio Pompilius: Larva; 6, a: Chrysalis.
6. Euplœa Liminace: Larva; 5, a: Chrysalis.
7. Euplœa Juventa: Larva; 7, a: Chrysalis.
8. Euplœa Plexippus: Larva; 8, a: Chrysalis.
9. Euplœa Chrysippus: Larva; 9, a: Chrysalis.
10. Euplœa Midamus: Larva; 10, a: Chrysalis.

The figures from 11 to 26 are arranged in form of a diagram, which is explained on page 53 of the Introduction; they represent the larvæ of the following insects:

11. Polyommatus ——— ?...... } Vermiform Stirps.
12. Thecla Favonius. ....
13. Thecla Betulæ. ....
14. Colias Marcellina. .... } Chilognathiform Stirps.
15. Pontia Brassicæ. ....
16. Papilio Ajax. ....
17. Papilio Polydorus................
18. Heliconia Euterpe. .... } Chilopodiform Stirps.
19. Heliconia Amphione. ....
20. Heliconia Thalia. ....
21. Acræa Vesta. ....
22. Biblis Leucothoë. ....
23. Genus allied to Limenitis. ...
24. Melanitis undularis. .... Thysanuriform Stirps.
25. Erycina Midas. .... } Anopluriform Stirps.
26. Hesperia ——— ? ....
27. Dissections of the Genus Euplœa: 27, a: Palpi. 27, b: Antennæ. 27, c: Proboscis. 27, d: Fore leg.
28. Dissections of the Genus Idea: 28, a: Palpi. 28, b: Antennæ. 28, c: Proboscis. 28, d: Fore leg.
29. Dissections of the Genus Heliconia: 29, a: Palpi. 29, b: Antennæ. 29, c: Proboscis. 29, d: Fore leg.
30. Dissections of the Genus Acræa: 30, a: Palpi. 30, b: Antennæ. 30, c: Proboscis. 30, d: Fore leg.

PLATE IV.

1. Lycæna Ælianus: larva. 1, a: chrysalis. The dissections were made from Lycæna Elpis: 1, b: Palpi. 1, c: Antennæ. 1, d: Proboscis. 1, e: Fore leg of the male.
2. Thecla Jarbas: larva. 2, a: chrysalis. 2, b: Palpi. 2, c: Antennæ. 2, d: Proboscis. 2, e: Fore leg of the male.
3. Thecla Appidanus: larva. 3, a: chrysalis.
4. Thecla Narada: larva. 4, a: chrysalis.
5. Thecla Longinus: larva. 5, a: chrysalis. 5, b: Palpi. 5, c: Antennæ. 5, d: Proboscis. 5, e: Fore leg of the male.
6. Colias Scylla: larva. 6, a: chrysalis.
7. Colias Glaucippe: larva. 7, a: chrysalis.
8. Terias Hecabe: larva. 8, a: chrysalis. 8, b: Palpi. 8, c: Antennæ. 8, d: Proboscis. 8, e: Fore leg. 8, f: Claw and membranaceous appendage of the anterior tarsus.
9. Pontia Coronis: larva. 9, a: chrysalis. 9, b: Palpi. 9, c: Antennæ. 9, d: Proboscis. 9, e: Fore leg. 9, f: Claws and membranaceous appendage of the anterior tarsus.
10. Pontia Belisama: larva. 10, a: chrysalis. 10, b: Palpi. 10, c: Antennæ. 10, d: Proboscis. 10, e: Fore leg.
11. Papilio Arjuna: larva. 11, a: chrysalis. 11, b: Palpi. 11, c: Antennæ. 11, d: Proboscis. 11, e: Fore leg. This species affords one of the types of the first section in the genus Papilio: antennæ with prominent annuli. (See Synoptic table, p. 59.)
12. Papilio Agamemnon: larva. 12, a: chrysalis. 12, b: Palpi. 12, c: Antennæ. 12, d: Proboscis. 12, e: Fore leg. Type of sect. ii: antennæ with an oval compressed club.
13. Papilio Amphrisius: larva. 13, a: chrysalis. 13, b: Palpi. 13, c: Antennæ. 13, d: Proboscis. 13, e: Fore leg. Type of sect. iii: antennæ with obscure annuli.

8 b
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[illegible] M Curtis

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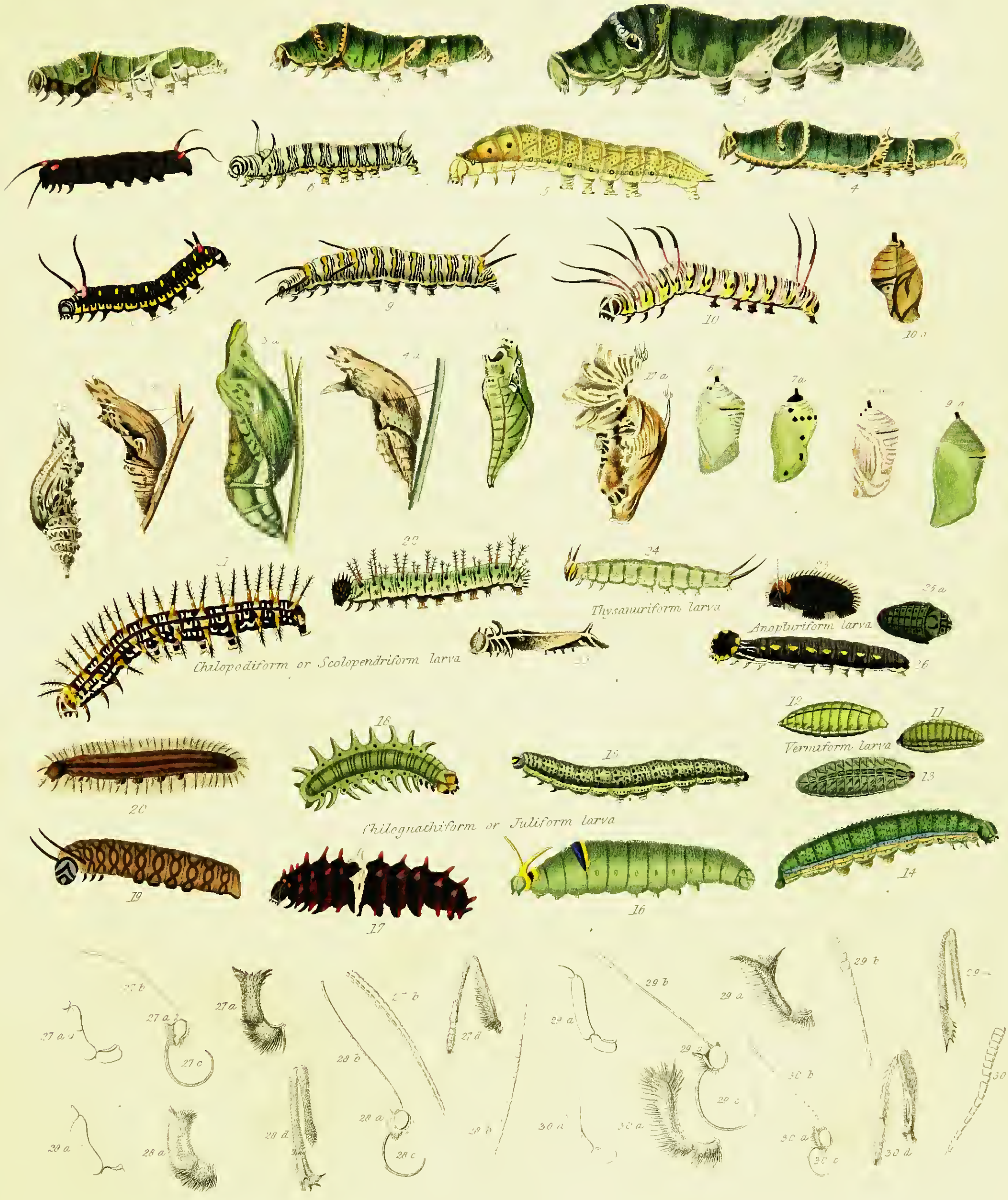

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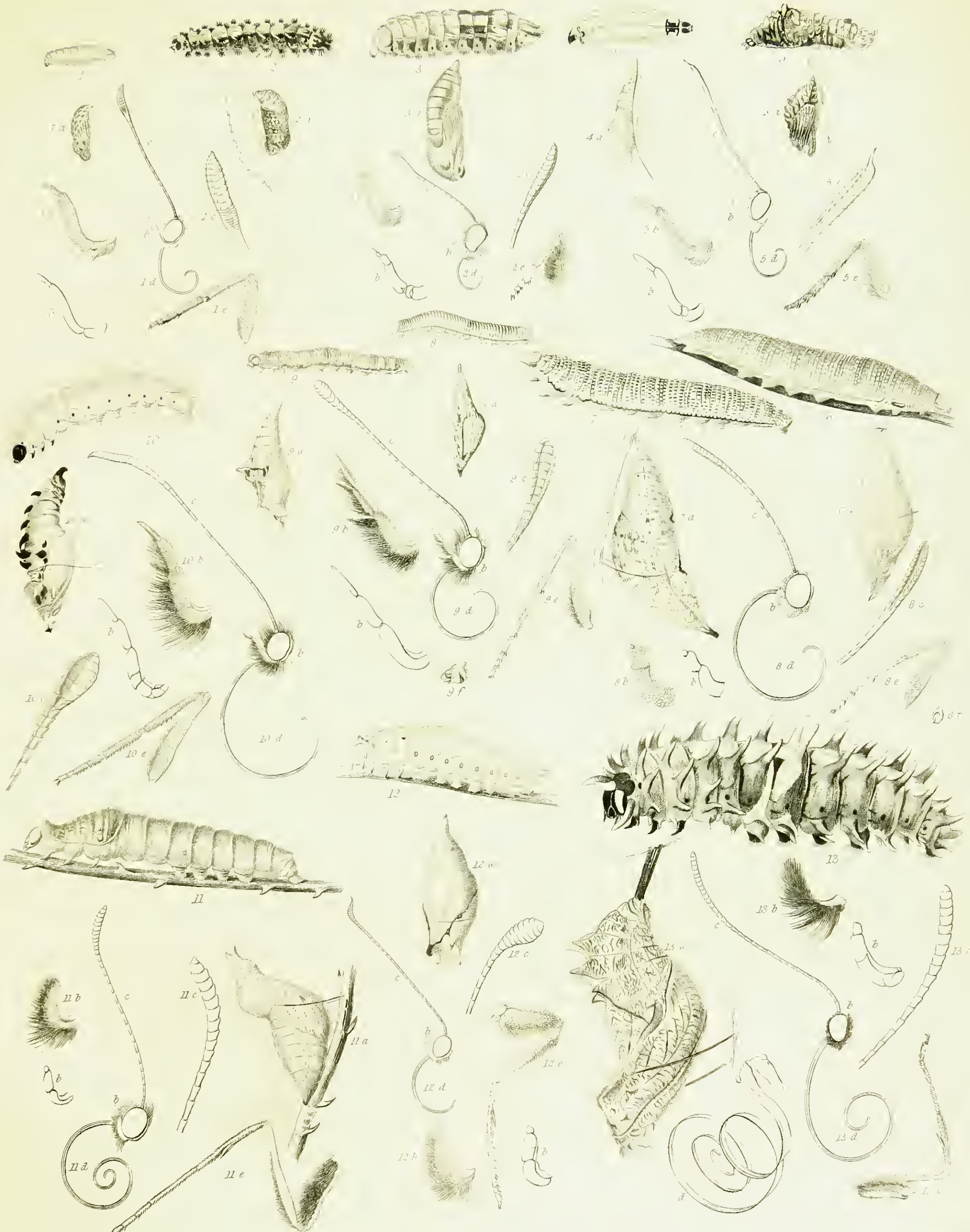


Drawn by J. M. Curtis.

London. Published by ... Allen & Co Leadenhall Street ...

the inner edge and somewhat smaller, at the anal angle, and a series of evanescent blackish bars parallel with the posterior margin; in the *female* the violet colour is confined to the base and disk of the fore wings, being covered with pale silvery irrorations, while the anterior and posterior margins, and the base and disk of the hinder wings, are pure brown; the anal ocellus in the posterior margin of the latter is of an intense black tint, and surrounded by a regularly defined narrow annular iris of a saturated silky white; the extreme anal spot, as well as the ocelli, forming the posterior series are surrounded by pale evanescent white rings; a faint macular band of dusky white also extends along the inner edge of the posterior series; the base of the hinder wings is covered with long silky hairs: *underneath* the wings, in both sexes, are gray with a shade of Isabella yellow, and marked with three strigæ, extending parallel with the posterior margin through both pairs, the interior one being more pronounced in the hinder wings and forming a broad white fascia; between the marginal strigæ and the base, the surface of the wings bears successive slightly interrupted marks, consisting individually of several contiguous undulated bands, of which the medial one is white, the next adjoining, on each side, brown, with a tint somewhat more saturated than the ground colour, and the exterior ones very narrow and white: of these compound marks there are three on the fore wings, the anterior one at a small distance from the base, the second on the disk, the third near the marginal series; the two former are very short, the latter extends entirely across the wing: the surface of the hinder wings bears contiguous fasciæ similar to those on the fore wings, but touching each other by means of several additional intermediate strigæ: there are two *anal ocelli* corresponding in form and character with those on the upper surface; they are disposed on a transverse rufous-orange band, the posterior one being bounded externally by a narrow silvery lunule, the other bearing a silvery speck on the extremity which is directed to the other ocellus. *Tails*, dark above, gray underneath and at the tip. *Body* above and underneath corresponding in colour with the wings. *Antennæ* brown annulated with white.

Our museum contains a single female, and seven male specimens collected chiefly in the cultivated districts of the neighbourhood of Surakarta. The larva was once found, as far as I recollect, on a leguminous plant, but from its similarity in habit to the larvæ of other *Theclæ*, its peculiarities were not noted. With the exception of *Cynthia Cardui*, which has a still wider range, this is the only indigenous Javanese species of diurnal Lepidoptera, which is also found in Europe. From a careful comparison of individuals contained in Mr. Haworth's and my own collections, and of its representation given by Hübner, it appears, that in these distant countries, the species agrees, in the most minute particulars, as far as regards markings and form, but a slight diversity is observed in the colour. In the European specimens the under surface of the wings is gray or brownish gray, the brown strigæ are more saturated, the white marginal lines are more brilliant, and the anterior marginal band is broader and of a purer white. In the Javanese specimens the ground colour has a tendency to Isabella yellow, and the strigæ are more faint and delicate. In size the specimens from both countries entirely agree.

16. Lycæna Damoetes. *Alæ suprà* maris *pallidè violaceæ limbo fusco;* fœminæ *fuscæ basi discoque cyaneis argenteo irroratis; utriusque sexus ocelli anales duo insignes iride sericeo-albâ cincti, fœminæ insuper serie posticâ ocellorum obsoletorum cum serie interiore macularum cuneatarum: subtùs cinereo-flavicantes strigis tribus marginalibus interiore latiore et vividiore, singulæ insuper strigis undulatis quinatim fasciculatis, fasciâ interiore anticarum obsoletiore, loco ejus nonnunquam annulo obsoleto basilari; posticæ ocellis analibus duobus extus punctis aureis ornatis,*

 exteriore

exteriore orbiculato lunulæ rufæ insigni subjecto, interiore minore oblongo lunulâ obsoletiore. (Exp. alar. lin. 10-14.)

Papilio P. R. Damoetes. Fab. Mant. Ins. tom. 2. p. 77. No. 707.

Hospitatur in Musæo Domini Banks, nunc in Mus. Soc. Linn. Lond. asservato, cum inscriptione ipsius Fabricii.

Polyommatus Damoetes. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 680.

Papilio Damoetes. Donov. Ind. Ins. (with a figure.)

This insect is so near *Lycæna Boetica,* that it was first introduced into this catalogue as a smaller permanent variety of that species, peculiar to Java; by the examination of the Banksian Cabinet of Insects, however, I have been able to identify it with the specimen described by Fabricius, under the name of *Pap. Damoetes,* as a native of New Holland. Our insect agrees closely with the specimen here preserved in size and painting; it is labelled with a ticket in Fabricius' own hand-writing, and his description leaves no doubt as to the subject itself. The specimen is sufficiently perfect to exhibit its real character, the tails only have been lost, and hence it has been described with " entire wings," and arranged in the corresponding section in the Encyclopédie. In many specimens the painting, on both surfaces, agrees with that of *Lyc. Boetica,* to the minutest particulars; a slight modification observed in some individuals is exhibited in the Latin description. We have, in our museum, four males and one female, perfect in all points. The tails are black and tipt with white. In size, and in the appearance of the upper surface, our insect resembles *Lyc. Telicanus;* the latter forms a natural passage to the following species, in which the catenulated character of the bands is more distinctly exhibited.

17. Lycæna Kandarpa. *Alæ suprà* maris *paginâ omni griseo violaceæ in certâ luce argenteo nitentes; posticæ puncto marginali ad basin caudæ nigro;* fœminæ *de basi ad discum cæruleo-argenteo nitentes limbis latissimis fuscis, posticæ serie ocellorum marginali, ocello ad basin caudæ saturatiore lunulâ rufâ cincto, ocellis exterioribus sensim pallidioribus arcubus angustis albis intus inductis, ocello interiore oblongo emarginato strigâ albâ obtecto; lunulæ circiter quinque huic serie parallelæ ad marginem interiorem limbi dispositæ et versus discum puncta aliquot obsoleta, in arcum: subtùs pallidè griseæ strigis tribus marginalibus albis, fasciisque catenulatis saturatioribus albo marginatis; strigâ exteriore lineæ nigræ marginali parallelâ continuâ obsoletâ, interioribus duabus undulatis maculas oblongas includentibus, fasciis anticarum duabus alterâ discoideâ brevi, alterâ posteriore completâ, posticarum fasciâ anteriore basali tenuiori, secundâ discoideâ brevi, tertiâ submarginali in regione anali ex arcubus interruptis efformatâ; anticæ insuper puncto marginali ad medium costæ, posticæ punctis duobus costalibus saturatis albo cinctis intervallo brevi distinctis; ocellis analibus quatuor, exteriore ad basin caudæ maximo saturatissimo orbiculari postice aureo irrorato, abruptè truncato, intus et ad latera arcu rufo maximo inducto, ocellis interioribus obsoletis angustatis, intimo minuto, intermediis ovatis transversis coadunatis in maculam reniformem, penultimo strigâ aureâ ornato, omnibus intus strigâ undulatâ albâ et denique tæniâ rufâ obsoletâ marginatis.* (Exp. alar. 1 unc. 2-3 lin.)

Wings above, in the *male,* pale violet blue, with a rich silvery reflexion, assuming in a certain light a dusky grayish shade, the colour being uniformly distributed over the whole surface: *hinder wings* marked exteriorly to the caudal appendage with an ocellate spot of a deep black colour, surrounded anteriorly with a pale blue lunule; a very faint transverse brown marginal bar, bordered with white, occupies in some individuals the space between this ocellus and the extreme anal angle; the wings are all surrounded with a delicate black marginal thread and an extreme

extreme grayish fringe: in the *female* the wings have a broad brown border, the blue colour being brighter than in the male, covered with a silvery gloss, confined to the base in the hinder wings, but spreading also over the disk in the fore wings; in the posterior wings the margin bears a series of ocellate spots, increasing in intensity of tint towards the caudal appendage, where the ocellus is intensely black and surrounded interiorly by a rufous crescent, the remaining ocelli have narrow white semilunar borders within and transverse marginal lines without; a series of lunular white marks passes regularly along the inner border of the marginal ocelli and a few obscure spots form an irregular arch across the disk. *Underneath* the *wings* are pale whitish-gray, and marked with catenulated bands, consisting each of two parallel undulated marginal threads of a brilliant white, including a broader fascia of a somewhat deeper shade than the ground colour; in the *anterior wings* a short fascia is placed transversely on the disk, the next posteriorly extends entirely across the surface; in the *posterior* pair three similar fasciæ are disposed in succession, the anterior one is composed of two narrow interrupted portions, the second is short and stands transversely on the disk, the third is irregular and extends in an interrupted course entirely across the wing and in the anal region is suddenly inflected and composed of short arcs; three white strigæ pass in both wings parallel with the posterior margin, the exterior one is obsolete and bounded by a brown marginal thread, the two next are waving, and include two undulated bands of the ground colour resembling the adjoining catenulated bands; the exterior margin of the fore-wings has in the middle a minute ocellate spot with a white annulet, and in the same margin of the hinder wings, near the costa, are two somewhat more saturated ocelli, separated by a small intervening space; in the anal region there are four *ocelli*, the exterior one, near the caudal appendage, is very large, nearly round, of a deep black colour, abruptly truncated and ornamented posteriorly with a streak of golden irrorations and surmounted interiorly and at the sides with a large rufous crescent; the remaining ocelli are narrow and obscure, the interior one consists of a small dot at the extreme anal angle, and the intermediate ones are ovate and united into a reniform spot, the penultimate one being ornamented with a streak of metallic irrorations; along their inner edge passes a white streak and interiorly of this a faint waving rufous band. The *thorax* and *abdomen* agree above and underneath, in colour with the wings; the *eyes* are bordered, the *tails* are tipt with white, and the *antennæ* are marked with white bands.

The *Lycæna Kandarpa* has, both in habit and in colour above, a great resemblance to *Lycæna Boetica*; but in the forewings the outer apical angle is more acute in both sexes, while the hinder wings are slightly lengthened towards the anal extremity in the male, and more abruptly rounded in the female. Our insect exhibits clearly the typical character of this section; the bands on the lower surface imitate the appearance of chains or necklaces, in consequence of the margins which are strongly undulated, and the base of the hinder wings is provided with dark ocellate spots encircled with white; these two marks, on which the sectional character is founded, exist in all the remaining Javanese species of *Lycæna*. Four male and three female specimens are contained in our museum, several of which are from the continent of India, and illustrate the range of this species in the old world: Mr. Haworth's collection contains a male specimen, agreeing in all points with our insect, which was found in a box imported from Brazil.

18. Lycæna Cnejus. *Alæ suprà* fœminæ *ad basin, anticæ usque ad discum lætè cæruleæ, argenteo nitidæ, limbis exteriore et posteriore fuscis; posticæ serie punctorum ocellatorum, ocellis duobus analibus saturatioribus rufo annulatis, penultimo insigniore, omnibus posticè abruptè terminatis;*

 huic

huic serie parallelè, ad marginem interiorem limbi, maculæ quinque cuneatæ, acumine introrsum spectante, in serie transversâ ordinatæ: subtùs canæ in flavescentem vergentes, singulæ stigmate brevi in disco fasciisque transversis catenulatis albo marginatis; fasciæ in anticis duæ margini postico approximatæ tertia saturatior margini discoque intermedia, hæc per alas posticas ducta ex fragmentis brevibus et in regioni anali ex arcubus interruptis efformatur; ocelli anales in posticis duo insignes æquales nigerrimi circulo aureo-irrorato marginali cincti lunulâque aurantiâ inducti; punctis insuper quatuor nigerrimis albo annulatis, tribus in serie basilari digestis, quarto marginali ad medium costæ. (Exp. alar. 1 unc. 1 lin.)

Hesperia R. Cnejus. Fab. Ent. Syst. em. tom. 5. Suppl. p. 430. No. 100, 101.

Polyommatus Cnejus. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 657.

The *female. Wings above* with a deep brown border; a light blue tint with a bright silvery reflexion is, in the *hinder wings* confined to the base, in the *fore wings* expanded to the disk, but entirely evanescent in a certain position towards the light; posterior border of the hinder wings bearing a series of dark ocellate spots, of which two, at the anal angle, are of a deeper tint and surrounded internally with bright rufous crescents; the penultimate ocellus exceeds the last in size and brilliancy of colour; all these ocelli are abruptly truncated behind, and the exterior ones are surrounded internally with narrow white crescents; a row of angular or wedge-shaped marks of a brilliant white, having the points directed towards the disk, passes along the inner edge of the marginal series; the cilia are gray: *underneath* the *wings* are gray with a faint Isabella-yellow shade; each pair is marked on the disk with a short transverse stigma, which in the *hinder ones* is slightly curved; the *anterior wings* have further three ranges of catenulated bands of a brown colour, of which the two exterior are parallel with and adjoining the posterior margin, being confined by the marginal strigæ; the third, in which the catenulated character is more distinctly exhibited, is intermediate between the marginal series and the disk; this is continued through the hinder pair, where it is more curved and somewhat irregular and infracted in its course; in the marginal series of ocellate spots, the interior ones form two strongly marked *anal ocelli;* these are regularly round, nearly equal in size and brilliancy of tint, intensely black, encircled by a pale orange iris, bordered internally by a ring of yellow metallic irrorations, which is partially interrupted at the internal edge; the hinder wings have further, four *ocellate spots* of an intense black colour with white iris, three of these are placed in a transverse series at the base, and a third, somewhat larger and more vivid, in the middle of the anterior margin close to the costa. The *thorax* above has a blueish cast and is covered with delicate hairs, the *abdomen* is brown; underneath the thorax and *legs* are covered with a delicate pure white down and the abdomen agrees in colour with the wings; the *antennæ* are banded with white.

A single female specimen from Java is contained in our collection. Mr. Haworth possesses two males: the upper surface in these is uniformly pale violet blue, with a narrow grayish brown posterior border, and two oblong black spots in the anal region, within the caudal appendage.

19. Lycæna Pandava. *Alæ suprà* fœminæ *omnes limbis latissimis fuscis cinctæ, anticæ ad discum usquè lætè cærulæ, argenteo irroratæ, posticæ fuscescentes in disco, cærulescentes tantum ad basin, serie ocellorum marginali, ocello anali penultimo saturatiore lunulâ rufâ intus cincto, ocello interiore angusto transverso didymo, strigâ albâ emarginatâ inducto; maculæ lunares albæ circiter quinque in ordine ad marginem interiorem limbi digestæ: subtus flavescenti-cinereæ nitore pallidè fusco,*

fusco, fasciis catenulatis strigisque marginalibus saturatioribus, singulæ stigmate discoideo brevi, pone discum fasciâ catenulatâ insigni in anticis continuâ ad marginem posticum subflexuosâ, in posticis interruptâ arcuatâ; strigis marginalibus tribus albis posteriore lineari continuâ, interioribus in anticis undulatis in posticis subflexuosis, quare in his maculæ subangulatæ in illis maculæ oblongæ fascias catenulatas marginales constituunt; ocelli anales duo, exteriore maximo saturato arcu latissimo rufo inducto et lunulâ auratâ extus prædito, altero oblongo, strigâ rufâ transversâ intus marginato annuloque aurato interiore ornato; puncta insuper in regione anali nigra duo, altero ocellulis intermedio altero ad imum angulum analem sito; punctis nigris albo cinctis in dimidio interiore alarum quinque, duobus costalibus insignioribus, tribus in serie transversâ subbasilari, ocellulo penultimo obsoletiore. (Exp. alar. unc. 1—lin. 13.)

The *female.* This species agrees in size and in the markings of the *upper surface* generally with that last described; a slight difference is afforded by the interior anal ocellus, which here consists of two narrow, oblong, confluent spots, without rufous lunule, but bounded interiorly by an emarginate white line; the wedge-shaped marks along the inner border are replaced by a transverse series of lunules: *underneath* the wings are yellowish-gray, with a very faint shade of brown; in the number and disposition of the markings our species also resembles *Lycæna Cnejus*, but it possesses a distinguishing peculiarity in the brilliancy of the white marginal strigæ, and in the greater breadth and deeper shade of the brown bands producing a striking contrast of colours: on the disk of both pair stands a short transverse stigma; behind this follows a broad catenulated band, regular in the *fore-wings*, with a few inflexions at the inner margin, but interrupted and irregularly curved in the *hinder wings;* the marginal white strigæ, three in number, are strongly pronounced; the most exterior passes without undulations, in contact with the brown marginal thread, through both pair; the two anterior strigæ are waving in the fore-wings and flexuose in the hinder wings, embracing two series of catenulated bands, composed of oblong spots in the former, and of angular ones in the latter; the posterior margin of the wing is adorned with two *anal ocelli;* the largest being placed exterior of the caudal appendage, and the other in the space towards the anal angle; an obscure black dot stands between them and another at the extreme angle of the wing; the exterior ocellus is covered internally by a very broad rufous arc, slightly notched at each side; a rufous streak is continued to the inner margin, being of a more saturated tint above the interior ocellus; a small exterior lunule of golden irrorations, adorns the large ocellus, and the small ocellus has on the margin an interrupted golden ring; there are five black spots encircled with white on the anterior portion of the hinder wings; two of these, of a more saturated tint, stand in contact with the costa, the remaining form a transverse basal row, the penultimate spot being rather obsolete. The *tails* are slender and tipt with white; the *antennæ* brown with white rings and tip; the *thorax* and *body* are brown above and gray underneath, the former being covered with a blueish down and the latter annulated with white.

A careful attention is required in the discrimination of the two species last described; the most prominent distinctions of the latter are, in the upper surface, the character of the internal anal ocellus, in the lower surface, the breadth, intensity of tint, and general habit of the transverse bands, and particularly the basal sub-ocellate spots of the hinder wings, which are five in number and disposed in a peculiar manner. I have confirmed my views regarding the diversity of this species from the former, founded on the comparison of a single specimen contained in our Museum, by the inspection of Mr. Haworth's collection; an individual here

here contained, though not completely identical with our insect, proves that it must be considered specifically distinct from *Cnejus*.

20. Lycæna Parrhasius. *Alæ suprà* maris *saturatè violaceæ pro vario ad lucem objectu in fuscum variantes, limbis angustis fuscis albo fimbriatis ; posticæ strigâ marginali punctorum ocellatorum, punctis duobus pone caudam sitis insignioribus, arcu angusto rufo intus cinctis lineâque albâ postice marginatis, punctis exterioribus sensim obsoletioribus : subtùs canæ squamis subargenteis obtectæ, singulis in disco stigmate transverso, tunc fasciâ catenûlata, in anticis continuâ in posticis interruptâ ; anticæ insuper fasciis duabus submarginalibus obsoletioribus, posticæ in serie marginali ocellis duobus, istis in paginâ superiore adversis, insignioribus orbiculatis nigerrimis in tæniâ latâ transversâ aurantiâ nidulantibus, lunulâ argenteâ extus inductis, intervallo denique angulum analem versus, maculis duabus oblongis angustis strigâ flavicante obductis, freto ; posticarum insuper puncta quatuor nigerrima albo cincta quorum duo basilares tertium ad marginem anteriorem quartum ad marginem interiorem in medio disposita.* (Exp. alar. lin. 10—11.)

Hesperia R. Parrhasius. Fab. Ent. Syst. em. tom. 3. pars. 1. p. 289. No. 108.
Papilio Parrhasius. Donov. Ind. Ins. (with a figure).
Polyommatus Parrhasius. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 657.

Wings above, in the *male*, deep violet blue, varying according to the light, to dusky brown, with a narrow brown border and white fringe; *hinder wings* bearing on the posterior border a series of ocellate spots abruptly terminated behind; commencing at the outer apical angle, the spots are small and obsolete; they gradually increase in size and intensity of tint, and exteriorly of the caudal appendages two deeply saturated brown ocelli, surrounded internally by a narrow rufous crescent, are disposed; two small confluent spots, forming a faint emarginate transverse band, stand between these and the extreme anal angle. *Underneath*, the gray ground colour is covered with coarse scales of a silvery hue; both wings are marked on the disk with a short transverse streak, behind this is a catenulated band, stretching across the entire surface, which is nearly regular in the *anterior*, but slightly infracted in the *posterior* pair; the *fore wings* have towards the margin two somewhat obsolete catenulated bands, confined by the marginal strigæ, and exterior to these a dark marginal thread, which is continued through the *hinder wings ;* in the latter the series of marginal ocelli corresponds with that of the upper surface, but is more pronounced, and the two ocelli situated exterior of the caudal appendages, being regularly round and of an intense black tint, are bedded in a broad orange fascia, and marked externally by a lunule of silvery irrorations; between these and the extreme anal angle are two narrow, obsolete, oblong spots, bordered internally by a faint yellow undulate streak; the hinder wings are further marked with four dots of an intense black colour, surrounded with a grayish ring, two of which are opposite to each other and at an equal distance from the base, the third is placed near the middle of the anterior, and the fourth near the middle of the posterior margin. The *thorax* and *abdomen* agree, on both surfaces, in colour with the wings; the *tails* are long, very slender, and tipt with white; the *antennæ* have a grayish extremity and white rings.

Our collection contains three male specimens of this species, and in that of Mr. Haworth I have examined a female, agreeing, as far as can be determined, from the condition of the individual, with our insect: in this female the colour above is brownish, and the submarginal line of ocellate spots is more distinct than in the male; the interior dimidial portion of the wing underneath has four black dots, agreeing in disposition

with

with our specimens, and in the anal region two ocellate spots of equal size are also apparent. I conclude with the remark that, regarding the three species last enumerated, I have used every means within my reach to form a correct determination; but they are so nearly allied to each other that further comparisons are still required: several other species are found in collections, of similar habits, but each possessing an individual peculiarity. No. 19 of our list, agrees upon the whole with the *Parrhasius* of systematic authors; but I have some apprehension that further comparisons of perfect specimens will prove it to be distinct from the species described by Fabricius with that name.

Genus THECLA.

Papilionis—Plebeiorum ruralium-species. *Linn.* Theclæ species. *Fab.* Polyommati species. *Latr.* Thecla. *Stephens.* Papiliones, Fam. O. Larvæ depressoscutatæ. *Wiener Verzeichnis*, 185. Les petits Portes-queue. *Geoffr.* Hairstreaks. *Haworth.*

Character. *Larva* lineari-oblonga, dorso plano, depresso; tota pilis brevissimis teneris solitariis obtecta (Tab. iv. fig. 3 et 4. Subgenus *Amblypodia: Amb. Apidanus, Amb. Helus.*): vel interdum fasciculis pilorum ad segmenta transversim ordinatis prædita (Tab. iv. fig. 2. *Thecla Xenophon*): capite parvo retractili.

Chrysalis oblonga, utrinquè obtusa, vel anticè gibba posticè attenuata, nuda, lævis, rarius transversè scutata. (Tab. iv. fig. 2, a; 3, a; 4, a; 5, a.)

Imago: Antennæ mediocres, strictæ; vel basi filiformes capitulo subabrupto, elongato, cylindrico-ovali; vel, de basi usque ad apicem sensim incrassatæ, capitulo haud distincto, obtuso, rarius acumine brevi prædito; articulis intermediis longioribus.

Palpi capite longiores, articulo basilari brevi, capiti adpresso, concavo, latiusculo, squamis densis obtecto, villis elongatis paucioribus vel creberrimis, intersitis; articulo secundo elongato, stricto, subassurgente, ultra medium capite soluto, apice truncato, undiquè squamis imbricatis teneris arctè obtecto, villis, in quibusdam crebris, interpositis; articulo tertio abruptè imposito, porrecto, oblongo vel subattenuato, nudiusculo vel lanuginoso, nonnunquam squamis tenerrimis obtecto.

Proboscis palpis magis duplò longior, apice ciliato, villis brevibus patentibus.

Caput breve, obtusum, latum. *Oculi* planiusculi, pube brevi arctè obtecti. *Corpus* breve, attenuatum. *Alæ* anticæ oblongæ, breves, obtusæ; posticæ rotundatæ vel subelongatæ, appendiculo anali et caudibus filiformibus vel rarius appendiculis brevibus obtusis subdentiformibus, instructæ. *Pedes* antici maris, tarsis articulo solitario, cylindrico, elongato ad latera spinoso, ungue brevi obscuro, inflecto, vel omnino inermi, superficie planâ verticali abruptè terminato; fœminæ tarsis quinque, cylindricis, primo elongato, secundo, tertio, quarto brevibus, quinto subincrassato, unguibus duobus brevibus arcuatis, villis densis reconditis, pulvillis plus minusve conspicuis, appendiculis duobus filiformibus brevibus intermediis; pedes medii et postici in utroque sexu conformes, singuli tarsis quinque articulatis, ultimo unguibus duobus minimis arcuatis sub pulvillis et squamis ferè occultatis; femora intermediorum eadem quæ *Polyommati.*

Character. *Larva* linear-oblong, with an uniform depressed back, either covered with short, delicate, solitary hairs, as in *Amblypodia Apidanus* and *Helus* (Pl. iv. fig. 3 and 4); or with tufts of short bristles, arranged in transverse rows at the segments, as in *Th. Xenophon* (Pl. iv. fig. 2); or entirely naked, as in *Amb. Longinus* (Pl. iv. fig. 5); in this species the larva has a peculiar character, being distended anteriorly, excavated at the sides, contracted behind, and throughout transversely swelled at the segments: the head in all these subdivisions is small and retractile. *Chrysalis* oblong, obtuse at both ends, or considerably swelled anteriorly and tapering towards the posterior

posterior extremity, smooth on the surface, in one subdivision only marked with prominent transverse scuta. In the perfect insect: *Antennæ* of moderate length, straight, either filiform at the base, with an abrupt, elongate, cylindric-oval club, which is slightly attenuated at both ends; or gradually and uniformly increasing in thickness from the base to the point without distinct club, rarely terminated by a short abrupt point (as in *Amblypodia Longinus*, Pl. iv. fig. 5, c.); the intermediate joints being in all cases the longest. *Palpi* longer than the head; basal joint short, concave, somewhat broad, applied to the head, closely covered with scales, among which few or more numerous hairs are scattered; second joint long, straight, beyond the middle detached from the head, abruptly terminated, closely covered with minute scales, among which hairs are dispersed, varying in character, number, and density, in different species; third joint tending forwards, short, abruptly attached and smaller than the second, oblong or attenuated, nearly naked, downy or covered with minute delicate scales. *Proboscis* more than double the length of the palpi, beset at the extremity with delicate patulous bristles. *Head* short, obtuse, broad. *Eyes* moderately prominent, plane and covered with a delicate down. *Wings: anterior* oblong, short, obtuse; *posterior* elongated with rounded margins or narrower towards the anal extremity, slightly sinuated, tailed, and provided with an anal appendage, or bearing short, oblong, distinct lobes, resembling obtuse denticulations: discoidal areola not closed. *Feet:* anterior, of the *male*, with a tarsus, consisting of a single cylindrical joint, with two lateral, and an intermediate series of spines, longitudinally arranged underneath, either terminated by a single claw or altogether obtuse, with an abrupt vertical warty surface at the extremity; of the *female*, with tarsi, consisting of five cylindrical joints; the first long, the second, third, and fourth, short, the fifth somewhat thickened and armed with two short strongly arcuated claws; two short filiform appendages and a pulvillus, occupy the middle of the foot, the whole being covered and nearly concealed from view by numerous short villi. The tarsi of the middle and posterior feet are all provided with five joints, the terminal one being armed with two claws, which, in the mid-leg, are concealed by the extreme scales; and the femur of the same leg has a short acute spine, as in *Polyommatus* and *Lycæna*.

This genus is illustrated, on the fourth plate, by the metamorphosis of *Thecla Xenophon;* fig. 2; 2, a: of *Amblypodia Apidanus;* of *Amblypodia Narada;* fig. 3; 3, a: fig. 4; 4, a; and of *Amblypodia Longinus;* fig. 5; 5, a: on the same plate the dissections of *Thecla Xenophon*, fig. 2, b; 2, c; 2, d; 2, e; and of *Amb. Longinus*, fig. 5, b; 5, c; 5, d; 5, e; are also given.

In the analysis of the Javanese species of *Thecla* I have continued the careful examination of the anterior feet, with the view to determine the accuracy of my former observations on the genera *Polyommatus* and *Lycæna*. As far as regards the peculiarity of these organs in the sexes, my researches have not only essentially confirmed my former remarks, but they have led to the determination of two prominent types of form, which are confirmed by other organs, particularly by the antennæ. The genus has accordingly been divided into two subgenera, the first comprising the true *Theclæ*, with clubbed antennæ, the second those species in which the antennæ gradually and uniformly increase in thickness from the base to the point without any distinct club: the latter, from the structure of the feet, has been named Amblypodia. The metamorphosis, as far as it has hitherto been observed, confirms these subdivisions; aud the illustrations given on my fourth plate (as referred to above) tend also to show the accuracy of the authors of the *Wiener Verzeichnis.* The family O (p. 185), comprising the European *Theclæ*, has been named *Depressoscutata ;* and this is also the true character of the larvæ of the *Theclæ* found in Java. As far as regards the structure of the anterior feet and the sexual modification of character assigned to them in the generic description, I have to state in this place,

place, that the details are founded on a careful dissection of *Theclæ Jarbas, Xenophon* and *Epicles* and of *Amblypodiæ Apidanus* and *Centaurus;* I have also partially extended my examinations to European species, and as far as I have yet proceeded, I have been confirmed in my opinions. It is my intention to give the result on a future plate: I shall therefore only add, that my dissections have led to a determination regarding the individuals constituting the sexes in *Thecla Quercus*, the reverse of that of most English Entomologists: in this I have been since confirmed by a reference to several Continental writers, particularly to Messrs. Latreille and Godart, in the Encyclopédie, and M. Ochsenheimer.

* *Antennæ capitulo cylindrico-ovali, utrinque manifestè attenuato: tarsi pedum anticorum maris articulo solitario, cylindrico, ungue incurvo haud exserto. Larva unius modò speciei hactenus a me observata est, nempe Theclæ Xenophontis; hæc verè depressoscutata, et insuper fasciculis pilorum ad segmenta transversim ordinatis, prædita est.*

Alæ posticæ appendiculo anali caudâque solitariâ munitæ.

THECLA strictè sic dicta.

21. THECLA KESSUMA. *Alæ suprà* fœminæ *basi discoque albæ cæruleo-argenteo, præcipuè ad basin, irroratæ, posticæ fusco nebulosæ; singulæ limbis fuscis cano fimbriatis, in anticis latioribus in posticis lineâ nigrâ intus albo marginatâ cinctis; anticæ insuper stigmate nigro in disco: subtùs fusco-canescentes albo strigosæ, strigis tribus marginalibus intermediâ ex maculis sagittatis interiore ex maculis arcuatis effomatâ; anticæ insuper strigis quatuor mediis, duabus interioribus in areâ intermediâ parallelis strictis in areâ anali subundulatis obliquè divergentibus, strigâ tertiâ per totam paginam ductâ undulatâ ad marginem interiorem cum strigâ interiore connexâ; punctis tribus minutis albis in areâ costali origine strigarum interjectis; posticæ strigis quatuor in paribus duobus, altero mediano subinterrupto in regione anali abruptè incurvato, altero subdimidiato ad strigem marginalem interiorem finito; ocellis analibus duobus nigerrimis, exteriore iride latissimâ fulvâ cincto, interiore in lobo anali sito et iride angustâ annulari albâ prædito, super quam tænia fulva intus aureo irrorata flexuosim ad marginem interiorem ducitur.* (Exp. alar. 1 unc. 3 lin.)

Anterior wings, in the *female, above,* bluish white, with broad exterior and posterior borders, and a short oblique black stigma on the disk; *hinder wings*, variegated white and brown with narrower borders, both pair being sprinkled at the base with a light blue silvery cloud of atoms, spreading on the hinder wings along the interior margin; fringe light gray, in the hinder wings bordered within by a black thread, edged interiorly with white; *anal appendages* black, surrounded exteriorly with white, bearing at the inner edge a fulvous spot and a minute green silvery lunule; *tails* black and tipt with white: *underneath* the surface of the wings is brownish-gray and marked with white strigæ, three of which pass close to, and parallel with, the posterior margin, through both pair, the intermediate striga, consisting of wedge-shaped marks, with the points directed inwards, and the interior one of lunular marks; the *anterior wings* have further between the middle of the surface and the marginal series four strigæ, two of which form on the disk a short regularly parallel pair, with a fainter intermediate streak; they are continued in the anal area by two undulated slightly diverging strigæ; the third striga extends, slightly waving in a gradual curve across the wing, being united posteriorly with the second, and the fourth reaches in a uniform character, half across the surface; between the origin of the three posterior strigæ and the costa stand three minute white dots; the *hinder wings* are likewise

N marked

marked with four strigæ, arranged in two pairs; the anterior pair, consisting of partially interrupted portions, crosses the middle of the wing, being suddenly curved inwards in the anal region, and bearing a faint intermediate streak on the disk; the posterior pair is more regularly transverse, and terminates abruptly at its contact with the marginal series; there are two *anal ocelli*, the largest, exterior to the caudal appendage, has in place of a pupil, an intensely black orbicular spot, and is surrounded by a very broad fulvous iris; the other occupies the anal appendage itself, and is surrounded by a delicate narrow white ring, between these is a roundish group of greenish silvery irrorations, and along one-third of the inner margin passes a narrow fulvous streak, bordered with black and ornamented, as well as the inner edge of the anal appendage, with a faint metallic striga. The *body* is brown above, with an obscure greenish tint, and agrees underneath in colour with the wings; the *antennæ* are faintly banded with white; the *tails* are long, slender, black, with a white extremity.

In the markings of the underside this insect resembles the *Lycænæ* of the second section, particularly *L. Celerio* and *Elpis;* I have therefore placed it at the commencement of the genus; but in all essential points it it a true *Thecla;* the club of the antennæ, though not very prominent, is distinctly marked; the anal appendage is fully developed. A single female specimen is contained in our museum.

22. Thecla Malika. *Alæ posticæ* maris *subelongatæ, margine apicali levissimè sinuato, dente prominulo rotundato ad basin caudæ; supra anticæ nigræ in certâ luce cyaneo relucentes, posticæ saturatè cyaneæ margine exteriore et canali abdomen recipiendo fuscis : subtus albæ in cærulescentem vergentes, anticæ limbo postico apiceque ochraceo fuscis; singulæ liturâ latâ utrinquè transversè quadratâ obliquâ ante medium sitâ, anticæ pone discum strigâ punctorum sex in medio interruptâ, posticæ strigâ subconformi pone discum ex maculis minutis suboratis in paribus inæqualibus arcuatim per paginam ductâ, maculâ interiore insigniore transversâ; tunc serie macularum ad marginem posticum strigâ undulatâ interiore cinctâ et denique ocelli anales duo altero exteriore orbiculato nigro, in tæniâ flavâ subundulatâ marginali nidulante, altero in appendiculo anali sito fimbriâ albâ cincto, maculâque virescente-argenteo irroratâ ocellulis intermediâ.* (Exp. alar. 1 unc. 1 lin. maris.)

Hinder Wings, in the *male* narrow and somewhat lengthened, with a slight oblong excavation along the posterior margin, succeeded by an obtusely rounded tooth exterior of the caudal appendage; *upper surface* deep blackish brown, the *anterior* with a shade of dark blue from the base to the middle, which only appears in a certain light, the *hinder wings* covered with a rich cyaneous tint excepting the exterior and interior borders; the latter is gray, and constitutes a canal to receive the abdomen: *under surface* white with a bluish shade, and in the *fore wings* a yellowish brown, somewhat cupreous posterior margin, spreading along the tip; a short brown streak, transversely truncated at each end, stands a little before the disk on each of the wings; exterior to this the fore wings bear a transverse striga of six or seven oblong subconfluent dots, which is interrupted on the disk, the continuation from the medial area being somewhat posteriorly disposed; a similar series is continued, at a corresponding distance from the base, through the *hinder wings*, consisting of oval dots disposed in interrupted and somewhat unequal pairs, passing in an irregular curve across the wing, the terminal streak at the inner margin being transversely disposed, oblong and larger than the others; along the posterior margin passes a series of dots, decreasing successively in size and strength of tint from the outer apical angle towards the caudal appendage, being confined internally by an undulated brown band; of two *ocellate spots* in the

the anal region, the exterior one is bedded in an irregular rufous patch, which has an undulated interior margin, and tapers off at each extremity in a short striga; the interior one, situated on the anal appendage itself, is surrounded by a white fringe, the intermediate space being occupied by a greenish metallic spot, and the oblique portion of the anal angle is marked by a black stripe covered by a branch from the rufous band. The *body* is dark blackish brown, the *eyes* are bordered by a white streak; the *antennæ* are black annulated with white and terminated by a grayish tip.

A single male specimen, in perfect preservation, is contained in our series: the narrowness and lengthened form of the hinder wings, with a slight posterior excavation, as represented in the description, obtains also in the two succeeding species.

23. Thecla Nasaka. *Alæ anticæ* maris *suprà nigræ in certâ luce ad medium usque cyaneo relucentes; posticæ subelongatæ margine apicali leviter sinuato: subtùs cinereæ limbo postico ochraceo-fusco subnitente in anticis saturatiore; singulæ notâ brevi discoideâ ex lituris duabus transversis, fasciâ insuper tenui fuscâ completâ albo marginatâ et strigâ tenuissimâ flavâ illius medio innatâ, in anticis rectâ, in posticis interruptâ, in regione anali arcu flexuosim ad marginem interiorem ductâ; appendiculo ocellisque analibus duobus nigris, exteriore orbiculato saturatissimo maximo iride tenui rufâ cincto, interiore oblongo punctis viridi-argenteis omnino tecto; striga denique irregulariter flexuosa, ortum ducens ab iride ocelli exterioris, obliquè per medium ocelli interioris ad appendiculum analem descendit, et tunc ad angulum interiorem assurgit, lineâ nigrâ, extus viridi argenteo irroratâ, limbatâ.* (Exp. alar. 13 lin.)

Wings of the *male*, *above*, agreeing in colour with those of the species last described; contour of the hinder wings likewise similar: *underneath* gray with pale ochraceous-brown posterior borders, spreading over the tip and more intensely coloured exteriorly; a narrow delicately striped band, consisting of two parallel brown strigæ edged with white and an intermediate yellow thread, which is more distinct in the hinder wings, extends across the middle of both pair, being regular in the former and somewhat interrupted in the latter, until it reaches the anal region, where it passes, after an abrupt curve, irregularly flexuose to the inner margin; on the disk of each wing stands a short transverse double litura; the anal appendage is oblong, black on the surface, fringed with gray, and has adjoining to it, in the posterior margin, two ocellate spots of more than usual size; the exterior one presenting a regularly orbicular black spot in place of a pupil, and being bounded exteriorly by a narrow pale rufous ring, a more saturated narrow rufous arc forming the interior iris; this is continued in form of a narrow band in an oblique course through the middle of the adjoining spot to the anal appendage, from whence it rises again for a short distance along the extreme angle of the wing, being edged exteriorly by a black streak covered with greenish silvery irrorations: an obsolete series of three successively paler black lunules, of which the first is covered with a silvery crescent, stands exterior to the large ocellus in close contact with the posterior margin. The *head* and *body* are brown above. The *thorax* is covered with lax white hairs and the *abdomen* with shorter yellowish hairs underneath. The *antennæ* are banded with white and tipt with rufous.

A single male specimen in a perfect state is contained in our series.

24. Thecla Varuna. *Alæ suprà fusco-nigricantes*, maris *paginâ omni præter apicem cyaneo saturato* fœminæ *glaucino nitentes: subtùs fuscæ diluto cupreo relucentes et basin versus nitore*

 purpureo

purpureo lavatæ; singulæ serie macularum obsoletarum margini postico parallelâ; anticæ insuper pone medium fasciâ fuscâ saturatâ completâ latâ externè albo marginatâ, angulum analem versus attenuatâ, stigmateque brevi in disco; posticæ fasciâ medianâ latâ subundulatâ, in regione anali arcuatâ et flexuosim ad marginem interiorem ductâ, utrinque strigâ albâ posticè saturatiore præditâ, tæniâque brevi discoideâ cum fasciâ completâ connatâ; areolâ anali ocello solitario maximo nigerrimo, intus rufo lunulato, fretâ; maculâque orbiculatâ atrâ in appendiculum analem, spatio intermedio, strigâque tenui ad marginem interiorem nigris, punctis albis irroratis. (Exp. alar. 1 unc. 3 lin.)

Wings above blackish brown, in the *male* with a saturated cyaneous, in the *female* with an indigo blue or deep glaucous shining tint, which, in the *fore wings*, terminates obliquely at a small distance from the outer apical angle, but in the *hinder pair* covers the whole surface, to a very narrow posterior marginal thread; the anal appendage has a rufous ground, on which a black spot is bedded, and is surrounded by a whitish fringe: *underneath* brown with a purple shade on the basal portion and disk, and a slight cupreous gloss spread over the whole surface; a broad band of a more saturated tint than the ground colour, with a narrow exterior white edge, passes behind the middle of the *fore wings*, tending slightly to the inner apical angle; a similar band pervades, slightly undulating the *hinder wings*, changing its direction in the anal region by an abrupt curve, and tending in a flexuose manner to the middle of the inner margin; it has a narrow white edge on each side, which in the anal region becomes deeper and gradually changes to a bright sulphureous yellow; a very faint waving brown band passes exterior of these, parallel with the posterior margin through both pair, to the ocellus in the anal region, and on the disk of each pair stands a short longitudinally divided streak, resembling in character and colour the principal band, being in the hinder wings parallel with, and in contact with its middle portion; a very large ocellate spot, having a deep black regularly orbicular pupil, and a narrow rufous, almost completely circular iris, consisting at the inner edge of a more intensely coloured arch, stands exteriorly of the tail; the anal appendage is large oblong and transversely attached, intensely black and surrounded by a very delicate alternately white and blackish fringe; between it and the exterior ocellus is an obsolete black spot covered with minute white dots, which are continued over a short attenuated black streak along one-third of the inner margin: the *antennæ* are banded and the *tails* are tipt with white; the *body* agrees in colour with the wings above, and the *abdomen* is yellow underneath.

We have three specimens, one male and two females, in our series: in the determination of the sexes, I was guided by the structure of the anterior feet, as they appear under the microscope. The male has a single incurvated terminal claw, the female has two minute curved claws, partly concealed by numerous villi. In the form of the posterior wings and in the habit this species resembles *Thecla Malika.*

25. Thecla Epicles. *Alæ suprà fuscæ,* maris *violaceo micantes; anticæ disco, posticæ limbo apicali aurantio-fulvis, in mare ex lunulis approximatis efformato, fimbriâ albâ nigro interruptâ anticorum obsoletiore: subtùs omnes lætè sulphureæ, limbo apicali sanguineo, posticarum lunulis albis intus marginato, maculisque cuneatis nigris in serie margini alæ parallelâ digestis; posticæ insuper puncto minuto nigro ante discum.* (Exp. alar. lin. 13—15.)

Plate 1, fig. 3.

Polyommatus Epicles. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 646.

Wings

Wings above blackish brown, with a violet reflexion in the *male*, which is of a deeper shade towards the base, the *anterior* bearing a large irregularly rounded rufous orange spot on the medial areola, the *hinder* being marked with a posterior border of the same colour; in the male the medial spot is smaller, consisting of a transverse cloud, and in the posterior pair the border is narrowed and undulated at the inner edge, being composed of confluent lunules; a narrow undulated black streak passes along the posterior margin; the *fringe* is white interrupted with black at the nervures, and in the fore wings evanescent towards the outer apical angle; the female has besides a short transverse black stigma before the disk of the fore wings, and in the hinder pair, near the middle, a faint orange dash: *underneath* the wings are bright sulphureous yellow; both pair have a sanguineous posterior border, which in the *anterior wings* is narrow and uniform, until it approaches the inner apical angle, where it is terminated by a short black streak edged on both sides with white; in the *posterior wings* it is broader and ornamented internally by a series of white arcs delicately edged on both sides with black; a series of small wedge-shaped black spots, bedded in an oblong sub-marginal cloud of white irrorations, is arranged parallel with the black marginal thread, which is confined by the extreme fringe; a minute black dot stands between the disk and base, and two more obscure ones are distantly arranged along the inner margin; the fore wings have besides a very faint series of brown lituræ, and the hinder pair of interrupted white streaks parallel with the post-marginal border; the *anal appendage* is terminated by a black spot and the *tails* have a white tip. The *body* is brown above and hoary underneath; the *legs* are alternately white and black; the *antennæ* are black with delicate white bands to the commencement of the club.

This species is not unfrequent in the acclivities near the confines of the extensive medial plain of Java. Our museum contains eleven specimens, of which several are males. It was named and described by Messrs. Latreille and Godart in the Encyclopédie, but the figure has not previously been given. The anterior feet, of both sexes, have been carefully examined under the microscope, and confirm the details given in the generic description.

26. Thecla Jarbas. *Alæ suprà* maris *sanguineo-fulvescentes, anticæ limbis exteriore et posteriore nervisque intermediis, posticæ strigâ marginali tenuissimâ nigris;* fœminæ *saturatè testaceæ nitore cupreo, limbis saturatioribus: subtùs canescentes nitore glaucino, singulæ liturâ transversâ fuscâ albo-marginatâ in disco, fasciâque insigni completâ pone medium fuscescente albo marginatâ in posticis subûndulatâ in regione anali saturatiore flexuosim ad marginem interiorem ductâ; ocello anali altero exteriore mediocri orbiculato lunulâ insigni aurantiâ intus inducto, altero maximo appendiculo anali imposito annulo albo in formâ fimbriæ circumscripto, plagâ subrotundâ nigricante ocellis intermediâ albo irroratâ, strigâ denique brevi obliquâ attenuatâ versus marginis medium desinente.* (Exp. alar. 1 unc. 5-7 lin.)

Papilio P. R. Jarbus. Fab. Mant. Ins. tom. 2. p. 68. No. 648. Hospitatur nomine a Fabricio ipso inscripto, in Mus. Soc. Linn. Lond.

Polyommatus Jarbas. Enc. Méth. Hist. Nat. ix. p. 646.

Papilio Jarbas. Donov. Ind. Ins. (with a figure.)

Wings above, in the *male*, brilliant reddish brown, inclining to scarlet, the *anterior* with broad blackish brown borders, more diffused towards the tip and the costal portion of the base, gradually diminishing in breadth towards the inner apical angle; medial nervures black and prominent;

nent; *hinder wings* narrow and lengthened, the ground colour being uniformly diffused over the whole surface to a very narrow black marginal thread; *anal appendages* tipt externally with black, and surrounded, within the brown fringe, by a white thread extending also towards the tail; in the *female* the wings are saturated testaceous with a slight cupreous lustre, the colour being uniformly diffused over the surface, increasing in strength towards the margins, but without defined borders: *underneath* the surface is satin-gray, with a faint glaucous cast, varying in intensity of tint in different individuals; on the disk of each wing stands a short oblong double streak consisting of two parallel grayish brown lituræ with a medial and two lateral narrow white lines; between this and the posterior margin a more saturated brown band pervades both pair, being nearly regular until it reaches the anal region, where, after a sudden flexure, it stretches directly across towards the internal margin, being bordered with a white striga exteriorly in the anterior and on both sides in the posterior pair, the tint becoming more intense as the band approaches the anal region, having a bright silvery lustre in well preserved specimens; the extreme anal angle is ornamented with two regularly round deep black ocellate spots, the exterior one being bordered internally with a brilliant orange lunule, the interior one, somewhat larger in size, covering the anal appendage, and being surrounded by a delicate white ring ciliated posteriorly; the intermediate space is occupied by a roundish group of greenish silvery atoms, bedded on a blackish patch, which sends off obliquely a narrow streak towards the inner margin. The *body* is testaceous brown above, gray underneath, and covered on both sides with delicate silky hairs; the *antennæ* are annulated, the club has a ferruginous tip, and the *tails* are black with a whitish extremity.

Our museum contains eleven specimens, of which five are females.

27. THECLA XENOPHON. *Alæ suprà* maris *fulvæ in sanguineum vergentes, limbis omnibus fuscis, anticarum latissimis, limbo exteriore singularum ad medium cum angulo abrupto dilatato;* fœminæ *paginâ omni unicolores brunneæ: subtùs canescenti-fuscæ nitore cupreo-ferrugineo lavatæ, liturâ brevi transversâ simplici albicante fasco marginâta in disco, fasciâque insigni fuscescente completâ pone medium extus albo marginatâ, in regione anali saturatiore, hic utrinque strigâ argenteo-nitente limbatâ et flexuosim ad marginem interiorem ductâ; ocellis analibus duobus, altero exteriore minore ovato transverso cœco, in plagâ saturatiore fasciæ marginalis nidulante, absque iride distinctâ, altero appendiculo anali ipso imposito maximo, dimidio exteriore strigâ albâ ad ocellum exteriorem productâ et denique fimbriâ nigrâ circumscripto; tæniâ ocellis intermediâ fuscâ transversâ strigâque brevi obliquâ angulo anali parallelâ, albo irroratis.* (Exp. alar. 1 unc. 2-3 lin.)

Plate iv. fig. 2, Larva; fig. 2, a. Chrysalis.

Hesperia R. Xenophon. Fab. Ent. Syst. em. tom. 3. pars. 1. p. 272. No. 47.
Papilio Melampus. Cram. pl. 362. fig. G. H. (the male.)
Papilio Xenophon. Donov. Ind. Ins. (with a figure.)
Polyommatus Xenophon. MM. Latr. and Godt. Enc. Méth. Hist. Nat. ix. 640.

Wings above, in the *male*, deep fulvous inclining to red, the *anterior* having broad black borders on all the margins, the *posterior* very narrow black marginal threads exteriorly and posteriorly, and the nervures, in general, of the same colour; near the middle the exterior border of both pair has a sudden angular projection, from which the borders continue broader to the base; in the *female* the

the surface of all the wings is uniformly deep brown; the anal region has in both sexes, within the extreme blackish boundary, a white thread, which encloses the anal appendage: *underneath* the wings are grayish brown with a slight cupreous reflexion; the disk of each pair is marked with a short oblique white streak, delicately bordered with brown, and intermediate between this and the posterior margin, a saturated reddish-brown striga passes the surface of both pair, being nearly straight in the *anterior*, and slightly interrupted in the *hinder*, until it approaches the anal region, where it makes a sudden curve, becomes flexuose, and terminates near the middle of the interior margin; it has a faint exterior edge of white, which, in the hinder pair, increases in intensity to the anal region, where it is of a brilliant satin white, and accompanied by a parallel interior striga of the same colour; the *anal appendage* is entirely covered by a round black spot; an oblong spot of the same colour stands exteriorly of the tail, in a marginal band of a more saturated tint than the ground colour, surrounded by a ferruginous ring, but without a distinct iris; a round group of white atoms occupies the space between this and the anal appendage; a brilliant white thread, commencing near the middle of the posterior margin, winds along the anal region and appendage, being edged by the extreme brown fringe: *body* covered with long delicate hairs, which are ferruginous brown above and grayish underneath; *legs* banded alternately white and black; *tails* black, tipt with white; *eyes* with a pronounced white edge posteriorly; *antennæ* annulated with white, the club being tipt with brown.

It may be useful to bring into one point of view, the discriminating characters of the two last nearly allied species, and to annex a few remarks on their history. I have satisfactorily identified the species named *Jarbas*, by the comparison of a specimen in the Banksian cabinet, marked with a ticket in *Fabricius*' own hand-writing. The prior name of *Jarbus*, which the ticket bears, and which is also found in the Mantissa Insectorum, where the insect was first described, has been exchanged in the Entomologia Syst. Emendata, for the more classical name of *Jarbas*, which had been applied to another species. The specimen preserved in the Banksian cabinet is a male, from Siam, and accurately agrees with the individuals collected by me in Java. The species named *Xenophon* by Fabricius is distinctly figured by Cramer with the name of *Melampus* (Pl. 362. G.H.), and less accurately by Donovan in his Indian insects. The authors of the Encyclopédie, in the description of the Diurnal Lepidoptera (Hist. Nat. ix. 646), cite the figure of Cramer in illustration of *Jarbas*, but according to the preceding statements it should be referred to *Xenophon*. In all descriptions hitherto given which I have seen, one sex only is delineated: I am now enabled to illustrate both sexes, and by that means, through the comparison of numerous specimens of each species, exhibiting the modifications peculiar to the sexes, to remove the ambiguity remaining in systematic writers regarding these two species.

The peculiarities of *Th. Jarbas* are the following: it is at least one-fifth larger than *Xenophon*, the longitudinal extent is also proportionally greater, and the general outline of the surface of the expanded insect is more regularly triangular; the ground colour of the upper surface, in the male, inclines to fulvous, the exterior and posterior borders alone are brown, and the latter decreases gradually in breadth to the inner apical angle; the hinder wings are entirely without any black discoloration towards the base; in the female a saturated testaceous tint, with a slight cast of metallic yellow, extends uniformly over the surface, with a very gradual increase of strength towards the margins. Several minute peculiarities of the under surface in each species have been detailed in the preceding description; and here I have only to note the brilliant orange lunule over the exterior anal ocellus, which affords a permanent characteristic distinction to *Jarbas*. In *Xenophon* the anterior wings are slightly rounded at the external apical angle; the exterior margin has a very slight sinuosity, which is too strongly expressed in Cramer's figure, and the general contour is somewhat broader than

than in *Jarbas;* the ground colour of the upper surface is more saturated, with less of a fulvous shade; the anterior wings are enclosed with borders on all sides, the interior, as well as the exterior and posterior border is dark brown; the borders generally are broader, have a deeper tint, and the exterior costal projection is more prominent; the hinder wings have a large black spot in the middle of the exterior margin, extending to the base, and gradually diffusing itself over the nervures; on the under surface the exterior ocellus is comparatively small, obsolete, oblong, or irregularly defined, bedded in a circular ring of the marginal band, but never provided interiorly with a fulvous arch: the female has above an uniform deep blackish brown colour without any yellowish shade.

Both species were occasionally obtained by breeding, but I have only preserved the details of *Thecla Xenophon.* The larva feeds on *Schmiedelia racemosa,* and was found in considerable abundance. The larva and chrysalis are represented on the fourth plate: fig. 2; 2, a. The drawings of the larva in our collection, which were made at different periods of the age of the insect, vary in colour from yellow with a greenish cast, to dark ferruginous brown, and at one period the lateral bands are very obscure.

The Hon. Company's Museum contains of *Thecla Jarbas* six male and five female specimens, and of *Thecla Xenophon* seven male and six female specimens, most of which were obtained by breeding.

28. THECLA NEDYMOND. *Alæ suprà* maris *nigræ, anticæ plagâ cyaneâ medianâ maximâ angulatâ, versus marginem interiorem attenuatâ, posticæ limbo cyaneo apicali latissimo: subtùs dimidiatim albæ ac fuscæ limite intermedio recto, dimidio apicali anticarum ad medium strigâ undulatâ subdiviso, plagâ interiore ex rufo ferrugineo nitente saturatiore; posticæ in regione anali fasciâ brevi insigni transversâ aterrimâ notatæ, utrinque puncto minuto accessorio; angulo anali flavo, ferrugineo maculoto, strigisque duabus obsoletis abbreviatis ejusdem coloris freto, maculisque insuper quatuor nigerrimis difformibus ornato, exteriore ocellari, medio duplici ex lunulis duabus oppositis, interiore brevi marginali; omnibus nitidè argenteo irroratis.* (Exp. alar. 1 unc. 4 lin.)

Papilio Nedymond. Cram. pl. 299. fig. E. F.

Posterior wings narrow and elongate, with a prominent notch in the anal region, whence they pass in a regular curve to the inner angle, bearing the tail in the middle, and the anal appendage, which is narrow, elongate, and contracted at the base, at the extreme point. *Upper surface* black; *anterior* pair with a deep cyaneous patch covering the whole discoidal area, broader anteriorly and gradually attenuated towards the interior margin; *hinder wings* with a broad posterior border of the same cyaneous tint, passing parallel with the margin over one-third of the entire surface, with a regularly defined inner edge: *underneath* the wings are white with a silvery gloss from the base to the middle and ferruginous brown posteriorly, the boundary between the basal and apical portions being regularly transverse, extending from the middle of the costa over the disk to the anal region; the apical portion is almost equally divided in the anterior wings by an undulating blackish striga, the inner portion being of a more saturated reddish brown tint; in the hinder pair the dark portion decreases in breadth towards the anal region, and terminates in a curve following the outline of the wings; a deep black streak, regularly transverse and tending to the inner margin, stands at a small distance from the anal curve, accompanied by a solitary dot at each extremity; the anal region is either entirely ferruginous or clouded with the brown ground colour of the apical portion of the wing, sending off two short evanescent ferruginous strigæ, parallel with the margin; this region is likewise adorned with several irregularly defined black marks, covered with rich greenish metallic irrorations; the first of these is an ocellate spot, exterior of the tail near the marginal notch, bearing a broad shining lunule, next follow two short

opposite

opposite transverse streaks, tending to the anal appendage, and finally a short narrow attenuated line, parallel with the oblique portion of the anal angle; the posterior margin is confined by a black marginal thread, edged interiorly by a narrow white striga, which is more pronounced at the internal angle; the surface of the anal appendage is black, the *tails* are tipt with white; the *body* is black above, white underneath, the sides of the *abdomen* being annulated; the *antennæ* are delicately banded, and the *legs* are marked with broad alternate rings of black and white.

29. Thecla Chitra. *Alæ suprà ferrugineo-fuscæ saturatæ subnitentes, anticæ immaculatæ, posticæ plagâ albâ terminali in regione anali maculis duabus nigris fretâ, exteriore punctis albis irroratâ: subtùs anticæ fulvæ basi dilutiore, stigmate obliquo flavo in disco, pone hoc fasciâ arcuatâ versus marginem interiorem saturatiore, ex lineolis confluentibus fuscis efformatâ, denique strigâ marginali tenui fuscâ cano fimbriatâ; posticæ albæ, limbo apicali latissimo fulvo, versus regionem analem attenuato in strigam tenuem flexuosim usque ad marginem interiorem excurrentem; lineâ obliquâ brevi flavicante tenuissimâ discoideâ, tunc ad medium alæ fasciâ obsoletâ ex punctis fuscis efformatâ et in areola anali strigâ transversâ aterrimâ ad marginem interiorem tendente punctoque solitario nigro in medio ejusdem marginis; pone quam strigam maculæ quinque difformes nigerrimæ seriatim in limite regionis analis dispositæ, primâ ad angulum exteriorem ortâ oblongâ, secundâ cuneatâ intùs strigâ viridi-argenteâ irroratâ, tertiâ subocellari annulo viridi-argenteo subjectâ, quartâ duplici ex lituris duabus oppositis cuneatis, totidemque strigis intermediis viridi-argenteis, quintâ denique attenuatâ margini interiori approximatâ et strigâ argenteâ ferè opertâ.* (Exp. alar. 1 unc. 5 lin.)

Plate I, fig. 5.

Wings agreeing in form, longitudinal extent, and in the notch and anal appendage of the hinder pair, with the preceding species; surface *above* dark brown, with a very slight ferruginous lustre, being paler on the disk and more saturated at the borders; in the hinder pair the anal region is covered by a broad white patch, confined posteriorly by a delicate black marginal thread and bearing two irregularly round black spots, the exterior one being dotted with white; the anal appendage bears a black dash, attenuated interiorly and marked laterally with a greenish silvery line; the extreme fringe of the hinder pair and the tails throughout being white: *underneath* the *anterior wings* are fulvous, the *hinder* silvery white, with a broad fulvous posterior border, attenuated towards the anal region, and continued by a narrow striga passing irregularly flexuose to the inner margin; the anterior wings are paler at the base, have an obscure yellowish litura on the disk, behind this a curved brown striga, increasing in breadth and intensity of tint towards the interior margin, and finally a black marginal thread; the hinder have a very delicate linear yellowish transverse streak on the disk, a medial band of brown dots, more saturated near the costa, and continued at the inner boundary of the anal areola by a very deep black broad regularly transverse streak, tending to the inner margin, and accompanied, a little above its termination, by a solitary black dot; the anal region is interiorly bounded by a series of diversified marks, of an intense black colour, disposed in a simple curve; it commences, near the outer apical angle, with an oblong black streak touching a wedge-shaped streak with a minute dash of green silvery irrorations at its inner extremity; this is followed by two large irregularly defined black spots which also appear on the upper surface, the exterior one being bordered at its inner margin by a crescent of silvery irrorations, the next divided into two

 portions

portions by the passage of the fulvous striga, bearing near the middle two silvery lunules opposed to each other; the series is terminated by a black streak, extending in contact with the fulvous band along the oblique portion of the inner margin, being nearly concealed by a corresponding streak of silvery irrorations; the anal appendage is black, and surrounded by a lax ciliated white fringe which is broader internally; the *thorax* and *abdomen* are brown above and white underneath, the latter being banded at the sides; the *feet* are white annulated with black; the *antennæ* are also delicately annulated, and the club has a broad white ring at its base and a ferruginous tip.

The resemblance, in general habit, in the outline of the wings and in the characteristic marks of the lower surface, between the two species last described, is so striking, as to cause an inquiry, whether, notwithstanding the palpable difference in colour, they might be no more than different sexes of the same species. A careful examination has however convinced me that this is not the case. In No. 28 the upper surface of the hinder wings is without the least indication of the ocellate spots in the anal region; in the lower surface the fascia, dividing the posterior portion of the fore wings, has a different direction, and in the hinder wings of the same species the dimidial portion has not any indication of a transverse discoidal striga, whereas No. 29 has a very distinct transverse line on the disk of the same wings. Our collection contains six specimens of *Thecla Chitra* and seven of *Thecla Nedymond*, which individually closely agree with the description given of them.

It is my duty to caution the reader against confounding our 28th species with the *Polyommatus Nedymond* of the authors of the Encyclopédic, and to state the reasons of my differing in this instance, from the learned authors of that work. Our 28th species, according to my judgment, is distinctly figured on the 299th plate of Cramer's work, with the name of *Papilio Nedymond*. This specific name is applied, in the Encyclopédie, to an analogous species, which is also described in this catalogue in the next subgenus in its proper section; and the authors of that work, perceiving some discrepancies between the latter species and Cramer's figure of the former, point them out in a note. These discrepancies relate chiefly to the anal appendage and the tails, and to the colours and markings of the anal region of the posterior wings underneath. Possessing specimens of both insects, I have been enabled clearly to identify Cramer's figure with our 28th species; and the detail of the peculiarities of the analogous species, will afford the means of a distinct discrimination.

** *Antennæ è basi usque ad apicem sensim incrassatæ, capitulo haud distincto; tarsi pedum anticorum in mare articulo solitario inermi obtusissimo, superficie verticali abruptè terminato: larva verè depressoscutata typum hujus generis exhibens in sectione prima vel tertia illustratur.* (Tab. iv. fig. 3 and 4.)

Subgenus AMBLYPODIA.

† *Caudâ solitariâ obliquè divergente, cum appendiculo anali elongato connata.*

30. AMBLYPODIA NARADA. *Alæ suprà* maris *nigricanti-fuscæ, plagâ medianâ maximâ cyaneâ, vel secundum aspectum ex purpureo fuscescente, ad basin usque extensâ, limbis apicalibus angustis;* fœminæ *dilutiores fuscescentes, plagâ medianâ azureo-purpureâ ex argenteo nitente limbis latioribus cinctâ: subtùs canescentes in mare saturatiores, strigâ communi fuscâ obliquâ ab angulo apicali anteriore regionem analem posticorum versus ductâ, extùs colore saturatiore limbatâ, paginâ omni huic strigæ interiori, ad basin usque, fusco pulverulentâ; serie duplici intra marginali ex lunulis obsoletis in posticis increscentibus nigro alboque pulverulentis, appendiculo anali intùs, caudâque medio obscuro albo notatis.* (Exp. alar. 1 unc. 6 lin.)

Wings

Plate I, fig. 8.

Wings above, in the *male,* blackish brown, with a cyaneous patch on both pair, corresponding in outline with the wings and covering the whole surface from the base to a regularly defined distance from the anterior and posterior margins, the tint varying in brilliancy according to the direction of the light; in the *female* the ground-colour is paler, the blue patch has a light azure tint with a purple reflexion, is less widely diffused, especially in the posterior pair, and the borders are proportionally broad: *beneath* the surface of the wings is brown in the male, with a glaucous reflexion and gray in the female, and the markings, although of the same character, are less prominent in the latter sex; a brown band, commencing at the outer apical angle of the fore wings, passes obliquely through both pair to the anal region of the hinder, where it forms a gradual curve and terminates at the middle of the inner margin, having the outer edge regularly defined and of a deeper tint, the inner gradually evanescent; the whole surface of the wing, from the band to the base, is speckled or irregularly mottled with blackish brown, and on each pair a very obscure stigma is scarcely perceptible; between this band and the posterior margin is a double series of obscure dotted lunules facing each other with their concavities, which in the hinder pair is more distinct, with gradually diverging lunules; the margins between the nervures, the inner series of lunules, the anal appendage at its inner edge, and the tails are clouded with whitish dots. The *body* is blackish above and brown or gray underneath: the *antennæ* are almost uniformly brown to the tip, which is ferruginous.

Our museum contains one male and one female specimen, both in high state of preservation; the former is represented in the eighth figure of our first plate. It was obtained from the caterpillar by breeding: its similarity, in the larva and pupa states, to *Amb. Apidanus,* will be pointed out in the subsequent remarks on that species. Our insect exhibits, in the form of its hinder wings a marked peculiarity, on which a section of this subgenus is founded; the anal appendage being more lengthened than usual, and united with the tail at the extreme angle of the wing.

†† *Caudis duabus distantibus exteriore minore, appendiculo anali abbreviato.*

31. Amblypodia Vivarna. *Alæ suprà nigricanti-fuscæ,* maris *plagâ maximâ medianâ in anticis subquadratâ in posticis triangulari, saturatè cyaneâ, nitente, vel secundum aspectum obscuro purpureo relucente;* fœminæ *pallidiores immaculatæ: subtùs fuscæ glaucino lavatæ, singulæ pone medium strigâ nigricante flexuosim arcuatâ, ex lunulis appositis in posticis luteo marginatis efformatâ; anticæ insuper, in area medianâ lituris duabus transversis parallelis, punctis tribus obsoletis costalibus et denique serie punctorum margini apicali parallelâ; posticæ ante basin lunulâ flavo marginatâ una cum striga obsoleta transversim ordinatis, serieque margini apicali parallelâ ab angulo anteriore instar punctorum quatuor vel quinque in ordine digestis, sequentibus lunulis totidem flavo marginatis; pone hanc ad imum marginem maculæ lunares obsoletiùs flavo punctulatæ tres in ordine digestæ, exteriore inter caudas mediâ.* (Exp. alar. 1 unc.—1 unc. 4 lin.)

Wings above, in the *male,* deep blackish-brown, the *anterior* with a large oblong brilliant cyaneous patch, the *posterior* with a triangular one of the same colour, varying in both according to the direction of the light to obscure purple, being separated from the margins by a regularly defined border of the ground colour, which is broader at the inner margin of the hinder wings where the

 anal

anal excavation has a grayish tint; in the *female* the whole surface is uniformly dark brown in both pair: *underneath*, alike in both sexes, brown with a glaucous tint, the surface being also marked with a few clouds inclining to a purple colour; an irregularly arched and flexuose streak, consisting of delicate lunules in close succession, passes through both pair; in the *anterior* pair it commences at the same distance from the costa and the inner margin, and after a short curve at each extremity forms a large arch in the middle area tending towards the posterior margin, in the *hinder* it winds over the surface in a serpentine course, and the lunules are individually edged externally with pale sulphureous yellow; the anterior wings have further two short transverse lituræ in the middle area before the disk, three obsolete marginal dots near the medial portion of the costa, and finally a row of dots parallel with the posterior margin; the hinder wings have, near the base, a lunule edged with yellow and an obsolete waving litura disposed in succession as a striga, then, behind the curved medial striga, a series parallel with the posterior margin, commencing at the outer apical angle with four or five successive obsolete dots, followed by as many lunules edged with yellow and continued in a flexuose direction to the inner angle, and finally, at the anal termination of the wing, three semilunar marks, faintly dotted with yellow, extending from the outer tail to the inner edge of the anal appendage. The *body* is brown above and gray underneath, and the *antennæ* have a brown tint to the ferruginous tip, the rings having a very faint grayish discoloration: the inner *tail*, which exceeds the other in length, is brown with a grayish tip.

This species differs from the former, as well as from the following, in the anal appendage and in the tails, and on the indications afforded by these, minor subdivisions have been proposed which remain to be confirmed by the Lepidoptera of other countries. Our specimens are four males and one female. As far as I have been able to observe, the anterior foot of the male is without claw and abruptly terminated by a vertical surface, agreeing with the character assigned to this subgenus.

††† *Caudis tribus, intermedio elongato, lateralibus minimis dentiformibus: appendiculo anali brevi.*

32. Amblypodia Apidanus. *Alæ suprà maris omnes paginâ totâ saturatè purpureæ, vel in certa luce cyaneo resplendentes, limbis angustissimis nigris, posticarum in regione anali subundulatis, canali abdomen excipiente cinerascente;* fœminæ *fuscæ plagâ maximâ cyaneâ, vel alio aspectu thalassino-argenteo nitente, de basi ultra medium extensâ, limitibus singulis marginibus parallelis: subtùs fuscæ canescente fasciatæ, margaritaceæ, anticarum apicibus posticarum paginâ ferè totâ nitore violaceo lavatis; singulæ ad basin tæniâ costali saturatè puniceâ oblongâ attenuatâ; anticæ fasciis tribus cinerascentibus, anteriore dimidiatâ vel in formà stigmatis abruptè abbreviatâ, alterâ pone medium sitâ, tertiâ submarginali, his in area anali cinerascente evanescentibus; posticæ basi totâ saturatè fuscæ, tunc plagâ latissimâ transversâ cinerascente violaceo lavatâ fasciâ insigni fuscâ cano-limbatâ fretâ, in area costali simplici latâ in mediana et anali autem ex seriebus duabus oppositis efformatâ, anteriore interruptâ alterâ continuâ fasciâ posteriore nigricante confluente et una cum illa in arcum per paginam totum ducta; denique intra marginem posticum strigâ nigricante flexuosa cano-limbatâ, maculisque duabus distantibus subocellaribus nigris intùs albo irroratis rarius punctis paucis inauratis ornatis.* (Exp. alar. 1 unc. 5—10 lin.)

Papilio P. R. Apidanus. Fab. Mant. Ins. tom. 2. p. 69. No. 658.
Papilio Apidanus. Cram. pl. 137. fig. F. G. (the male.)

Papilio

Papilio Dorimond. Stoll, Suppl. à Cram. pl. 37. fig. 4 and 4 D. (The female.)
Polyommatus Apidanus. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 652.

Wings above, in the *male,* covered on the whole surface, excepting a very narrow posterior black marginal thread, with a saturated purple tint, reflecting in a certain light a cyaneous gloss, or transmitting in another aspect the blackish ground colour with a faint livid lustre; in the *female* the wings are blackish brown, with a brilliant cyaneous patch, adorned with a rich silvery gloss of a more intense tint at the base, and defined in both pair according to the outline of the wing, being separated from the margin by a broad regular border of the blackish-brown ground colour. *Underneath* the wings are alike in both sexes; the ground colour is deep brown with a reddish cast, and marked with broad cinereous slightly yellowish bands, and with occasional pearly spots; the tips of the *fore wings* and the whole surface of the *hinder,* being covered with a purple reflexion; the wings bear individually, at the base, near the costa, an oblique attenuated streak of a deep crimson shining tint; the anterior have further three grayish bands, of which the first is abruptly terminated before the disk, and often appears in the form of a short stigma, the two others are terminated in the anal region at a small distance from the inner margin; the exterior band is often undefined and spreads diffusely to the margin; in some specimens a few minute grayish dots stand near the base; in the posterior wings the basal portion is dark brown; a broad cinereous band, highly tinctured with purple, occupies the medial portion, bearing a compound brown band faintly bordered with gray, consisting in the costal area of a short simple brown patch to which two parallel bands are joined, the anterior being interrupted the posterior continued and united with a deep ferruginous blackish brown band which passes in an arch across the disk; exterior of this are a few obsolete dots near the posterior margin being defined internally by a narrow waving blackish striga; the dots towards the outer apical angle are very faint, but in the anal region are *two* pronounced black *subocellate spots,* the exterior being placed between the tails, and the other which is largest, at the extreme anal angle; they are generally speckled with white within and at the sides and in some cases adorned with a few silvery spots. The *body* is deep blackish brown or purple above, and ferruginous brown and hairy underneath; the *antennæ* are nearly throughout ferruginous brown; the intermediate *tail* is narrowly tipt with gray. The *tarsi* of the male are covered above with small, and of the female with large scales, which appear pendulous under the lens.

Amblypodia Apidanus appears, agreeably to my observations, to be the most abundant species of this section. Our museum contains at least sixteen individuals, three-fourths of which are females. Most of these were obtained while I was carrying on my observations on the metamorphosis of Javanese Lepidoptera. The larva feeds on the leaves of several species of *Eugenia* and *Calyptranthes.* It occurred not unfrequently, and was from time to time undergoing its change in my breeding cages. Observing some difference in the individuals, which I ascribed to the difference of age, the subject was more than once delineated; the forms under which I observed it are represented in the third and fourth figures of the fourth plate. On arranging my materials for publication, and examining them with more minuteness than was practicable during a very extensive series of inquiries, I discovered our 30th species, *Amblypodia Narada,* mixed with a large number of individuals of *Amb. Apidanus,* obtained by breeding, and designated by the same mark. It now was manifest to me, that what I had considered, in the larva state, a mere variety of form, owing to the age of the individual, was in reality a different species, modified in the perfect insect, in the character of the wings and affording the type of a separate section in the subgenus. But, although this fact was apparent, yet the general agreement of the two larvæ, as well as the respective chrysalides, confirmed

confirmed the character of *depressoscutata* given to it in the generic description, in conformity with the denomination originally employed in the Wiener Verzeichnis. I feel it my duty to make this candid statement in this place, as it is not in my power to indicate, with entire certainty, which of the two larvæ No. 3 and No. 4 of my fourth plate, belongs to *Amb. Narada*, and which to *Amb. Apidanus*; the indication I have given in the explanation of the fourth plate is provisional, and requires a final confirmation.

33. Amblypodia Centaurus. *Alæ suprà* maris *purpureæ nitore in chalybeum vergente vel in alio aspectu violaceæ fusco relucentes, fimbriâ et posticarum canali interiori abdomen excipiente nigris;* fœminæ *nigricantes, singulæ plagâ amplissimâ cyaneâ fulgidâ ad basin æruginoso irroratâ posticè sensim pallidiore, limbis exterioribus anticarum latioribus: subtùs anticæ canescentes apicibus submargaritaceis, plagâ basali maximâ extùs costam attingente intùs appendiculo oblongo obliquo attenuato cano-cincto stipatâ; fasciâ medianâ cano limbatâ ad marginem interiorem fractâ et fasciâ posticâ intùs evanescente saturatè fuscis; in area mediana maculis duabus oblongis et fasciâ brevi discoideâ saturàtè fuscis annulis strigisque margaritaceo nitentibus cinctis; in area anali maculis duabus obscuris basi connatis; posticæ obscurè margaritaceæ violaceo nitentes, ad basin maculis pluribus difformibus cano marginatis in seriebus duabus ordinatis; tunc fasciâ insigni medianâ cano limbatâ bipartitâ ramo anteriore interrupto, et denique fasciâ apicali cum striga undulata cana intùs limbata saturatè fuscis; maculæ tres nigerrimæ semiovatæ ad angulum analem in serie margini posticæ parallelâ confluentes, lætissimo viridi-aureo irroratæ, imâ puncto nigro fretâ.* (Exp. alar. 1 unc. 8 lin.-2 unc.)

Papilio P. R. Centaurus. Fab. Mant. Ins. tom. 2. p. 68. No. 646.

Hospitatur in Musæo Domini Banks, Societati Linneanæ Londinensi munificè donato, nomine à Fabricio ipso inscripto.

Polyommatus Centaurus. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 658.

Wings above, in the *male,* bright purple inclining to azure, with a rich cyaneous gloss uniformly spread over the surface assuming according to the light a livid cast varying to brown, surrounded along all the margins by a narrow black thread, which is somewhat broader in the anal region; inner marginal canal for enclosing the abdomen gray with a silky down; in the *female* blackish brown with a large medial cyaneous patch, circumscribed in both pairs according to the outline of the wing, broader along the exterior margin and gradually decreasing in intensity of tint towards the posterior borders; the medial area covered with a rich refulgence, the base with a radiating verdigris cloud varying according to the direction of the light: *underneath,* ground colour of the *fore wings* cinereous, with a pearly somewhat violaceous cloud towards the outer apical angle; the basal portion, spreading near the costa towards the middle of the wing, but evanescent in the anal area with an oblong dentiform obliquely diverging process edged with gray, within which are two very obsolete brown spots; then a defined medial fascia with undulated marginal gray strigæ abruptly infracted in the anal area, and a broad posterior border evanescent internally, and in most individuals divided by a faint transverse grayish striga, dark ferruginous brown; two dark oval spots, commencing at the base and successively larger, encircled with pearly silvery rings, adorn the medial area, and are followed, on the disk, by a short broad band edged with shining silvery lines; *hinder wings* with a pearly ground colour, minutely dotted with gray, and covered on the disk with a rich violet reflexion, marked at the base with two transverse rows of oval or irregularly oblong spots of ferruginous brown, edged with gray, and increasing in size as they recede from the base; a very broad band of the same brown tint, edged

edged with undulated gray strigæ, consisting in the middle and anal areolets of two branches, of which the anterior is interrupted, crosses the middle of the wing in form of an arch; and a very broad border verging to ferruginous passes along the posterior margin, being edged internally by a waving line of a deeper tint; inner extremity of the margin, in the anal region, ornamented with three oblong semi-ovate intensely black spots disposed at the extreme angle in a uniform connected series, covered with rich golden irrorations inclining to green: *thorax* above in both sexes, irrorated with a verdigris shade; *abdomen* brown; both these covered underneath with a tawny down; *antennæ* nearly uniformly brown; intermediate *tail* with a dull grayish tip, lateral tails minute, obscure.

I have been enabled to identify this species with the *Hesperia Centaurus* of Fabricius, by the examination of a specimen contained in the Banksian Museum, bearing a ticket in his own hand-writing. It is closely allied to the following, but its prominent distinctions are the pure purple tint of the upper surface of the male, and the brilliant, pearly rings, enclosing the spots in the medial area of the fore wings of both sexes, underneath. Besides other peculiarities which appear in the detailed descriptions, the markings are more pronounced in our specimens of *Centaurus*, and the tints are more diversified. Our collection contains three male and six female specimens of this very beautiful species which, as far as I have observed, has not yet been figured.

34. Amblypodia Helus. *Alæ suprà* maris *saturatè azureæ lætissimè argenteo-relucentes, lunulâ ad appendiculum analem albâ, fimbriâ canalique abdominali posticarum canis: subtùs canescenti-fuscæ, maculis fasciisque saturatioribus, lineis sordidè albis absque ullo splendore limbatis; anticæ in area mediana maculis tribus, in serie ordinatis, interiore minore, exteriore latiore, fasciam brevem mentiente, et in area anali, versus basin, maculæ duæ obliquè dispositæ; pone discum fasciâ ex maculis brevibus confluentibus, in medio fractâ, marginem interiorem non attingente, et denique fasciâ apicali obsoletâ cano-strigosâ; posticæ ad basin maculis circiter sex in serie duplici dispositis, tunc fasciâ dimidiatâ submaculari arcuatâ margine interiore terminatâ; pone discum fasciâ maculari completâ arcuatim paginam percurrente, et denique fasciâ obsoletâ margini postico parallelâ lineis undulatis obscurè canis limbatâ; in regione anali maculæ tres nigerrimæ exterioribus oblongo-lunaribus intimâ ad angulum sitâ subrotundâ, omnibus strigâ undulatâ viridi-aureâ intùs limbatis.* (Exp. alar. 1 unc. 10 lin.)

Papilio Helius. Cram. pl. 201. fig. F.G.

Polyommatus Helus. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 652.

The peculiarities of this species, in the upper surface, are, a most brilliant azure tint, extending uniformly over the whole, and reflecting a rich silvery lustre, similar to that of *Morpho Adonis*, but of a more saturated hue; in the lower surface the spots and bands are edged with delicate whitish rings and lines, but without any pearly lustre or metallic gloss. The disposition and the character of the bands is also peculiar in several points: they consist of confluent fragments, bordered by strongly undulated strigæ, appearing macular, and the medial band of the hinder wings is simple.

My account of this species is unsatisfactory, since we have but a single male specimen in our collection: it is however in high perfection, and exhibits, unchanged, the rich brilliancy of the upper surface. The figure of Cramer represents the marginal lines which confine the bands as they exist in our specimen.

35. Amblypodia Eumolphus. *Alæ suprà* maris *smaragdinæ ex aureo lætissimè micantes; anticæ limbo apicali angusto atro margini prorsus parallelo, posticæ limbis omnbius latioribus atris;*

fœminæ

fœminæ *nigræ singulæ plagâ smaragdinâ aureo micante, anticarum ad discum extensâ, posticarum basilari triangulari: subtùs fuscæ in canescentem vergentes, maculis fasciisque saturatioribus notatæ; anticæ maculis tribus ovatis annulis sericeo-flavis margaritaceis cinctis, in area mediana seriatim ordinatis, basilari minore, exteriore discoidali fasciam brevem mentiente, areâ anali huic serieï contiguâ dilutiore maculisque duabus oblongis oblique divergentibus fretâ; tunc pone discum fasciâ insigni marginem interiorem vix attingente strigis undulatis flavicantibus limbatâ ad medium infractâ, et denique fasciâ submarginali obsoletâ strigis canescentibus marginatâ; posticæ maculis circiter sex inæqualibus cano-marginatis, prope basin in serie duplici ordinatis; tunc fasciâ medianâ insigni, in area costali latâ simplici, in mediana autem et anali ex ramis duobus parallelis undulatis efformatâ, lineis canis limbatâ; tunc ad marginem posticum fasciâ obsoletiore et denique ad imum angulum analem maculis tribus oblongo-lunaribus contiguis, interiore subocellari puncto aterrimo fretâ, omnibus introrsum strigâ undulatâ viridi-aureo fulgidâ marginatis.* (Exp. alar. 1 unc. 7 lin.—2 unc.)

Papilio Eumolphus. Cram. pl. 299. fig. G. H. (the female.)

Polyommatus Eumolphus. MM. Latr. et Godt. Enc. Méth. Hist. ix. 652.

Wings above, in the *male*, deep emerald-green, with a rich golden refulgence, spreading over the surface to a deep black border, which is narrow and regularly defined in the *fore wings*, broader and indented in the *hinder wings*; in the *female* black, the greenish golden lustre being limited, in the fore-wings to a medial patch extending to the base, and in the hinder to a triangular spot occupying the basal areolet: *underneath* brown, in some individuals inclining to gray; *fore wings*, with a series of three successively larger dark brown spots in the medial area surrounded with pearly shining rings, the first near the base being smallest, the exterior one on the disk constituting a short broad band bordered with white undulated marginal lines; the contiguous portion of the anal area marked with two oblong tapering obliquely diverging spots of the same colour; behind the disk follows a broad dark-brown complete fascia, broken in the middle, with white undulated edges, and finally, parallel with the margin, a more obscure band with paler grayish undulations; *hinder wings* with six or seven oval or irregularly round dark brown spots, narrowly edged with gray, disposed in two successive interrupted rows near the base; next, a more prominent transverse band, of the same colour, simple and broad in the costal area, subdivided into two parallel branches, in the medial and anal area; behind this an obsolete band parallel with the margin, faintly undulated with gray, and succeeded in the anal region by three deep black oblong lunular spots, arranged in regular succession close to the margin, the interior one being somewhat larger and marked with an intensely black subocellate spot, the whole being confined along the inner edge by a waving emerald green band richly covered with irrorations of a golden lustre. The *body* above agrees in colour with the adjoining portion of the wings, and underneath is covered with a light gray down. The *antennæ* are brown to the middle and ferruginous towards the extremity. The intermediate *tail* is slender, tipt with gray, and the lateral tails are very minute.

Cramer gives a distinct figure of the male of this species. Our collection contains one male and two female specimens; by these materials I have been enabled to point out clearly the difference between *Eumolphus* and *Helus*, and to remove the doubt, expressed by the authors of the Encyclopédie, regarding their distinctness as species.

36.

†††† *Caudâ solitariâ longissimâ: appendiculo anali lineari subelongato.*

36. Amblypodia Sugriva. *Alæ suprà* maris *atræ, anticæ nervo costali extimo flavicante ad apicem striolis tribus obliquis tenuissimè signato, posticæ fasciâ apicali latâ cyaneâ in saturatè thalassinum variabili, angulum exteriorem non attingente; margine interiore ad basin fusco ultra medium flavicante, areolâ anali caudâque fulvis, lunulis duabus nigris, alterâ exteriore denti marginali approximatâ, alterâ in appendiculo anali sitâ: subtùs ochraceo-fuscæ fasciis maculisque saturatioribus brunneis, ex flavido tenuissimè limbatis; anticæ maculâ basali, stigmate brevi in disco, fasciisque tribus latissimis, primâ anteriore dimidiatâ in area anali abruptâ, alterâ pone discum completâ angulum analem versus attenuatâ margine postico insigniter undulatâ, tertiâ angustiore marginali subarcuatâ ex maculis subconfluentibus efformatâ; posticæ maculâ ovali ad basin, costæ approximatâ, tunc fasciâ maculari insigni irregulariter arcuatâ, maculis juxta costam subconfluentibus versus marginem interiorem per paria subdistantia ordinatis; pone discum fasciâ variegatâ ex lunulis fuscis introrsùm cano adnatis conflatâ, paginam arcuatim percurrente parte dimidiâ costali simplici anali vero duplici; tunc strigâ tenui completâ fuscâ subflexuosâ, et denique serie macularum oblongarum fuscarum, margini parellelâ, maculis duabus in regione anali saturatioribus subocellaribus atris, ad basin caudæ utrinque dispositis, maculâque oblongâ atrâ in appendiculo anali, seorsùm strigâ brevi viridi-aureâ irroratis.* (Exp. alar. 1 unc. 7 lin.—Long. ab apice costali ad append. anal. 1 unc. 3 lin:—ab apice costali ad extrem. caudæ 1 unc. 10 lin.)

Extent of wing proportionally great in the longitudinal direction of the body; hinder wings narrow, gradually tapering to the anal extremity, with a single marginal notch near the base of the tail. *Wings above,* in the *male,* black, the *anterior* with the extreme costal nerve yellowish and marked near the apex with three delicate oblique black lines; the *posterior* with a broad cyaneous marginal band varying according to the aspect to saturated sea-green, terminating at a small distance from the outer apical angle; inner margin brown from the base to the middle, then yellowish gray and in the anal region orange, which colour extends to the extremity of the tail; there are two black lunules in the anal region, one exterior near the marginal notch, one on the anal appendage: *underneath* ochraceous brown with spots and bands of a more saturated colour bordered throughout with a delicate yellowish line; *anterior* pair bearing an oblong spot near the base, a short transverse stigma on the disk and three broad transverse bands; the first, at a small distance from the basc, dimidial, abruptly terminated at the anal areola, the next a little beyond the disk, extending across the whole surfacc attenuated and tending slightly to the inner apical angle, with an irregularly waving posterior margin; the third somewhat narrower than the former consists of adjoining spots and extends in a gentle curve over the exterior portion of the wing; the *hinder wings* have an oval spot near the base in contact with the costa, then a broad irregularly interrupted band passing in an arch across the surface, composed near the costa of subconfluent maculæ, but on the disk and near the inner margin of several successive pairs of distinct oval spots; behind the disk a series of brown arcs margined with yellow forms a curved band which extends over the whole surface being simple near the exterior margin, but consisting of a double series of parallel arcs more deeply tinctured as they approach the inner margin; beyond this follows a delicate brown thread which extends flexuose across the entire wing, forming an inner boundary to a series of oblong spots close to and parallel with the margin, which is continued in the anal region by two deep black ocelli,

 one

one at each side of the base of the tail, an oblong spot of the same colour marking the anal appendage, all these being adorned individually, at their internal edge, by a delicate streak of greenish silvery irrorations. *Body* black above covered with a white down underneath: *antennæ*, black with a ferruginous tip, sprinkled with a beautiful snow-white powder underneath to the base of the club, gradually increasing in intensity of tint exteriorly. *Tails* uniformly bright orange, with a medial nerve of the same colour and a delicate fringe at the sides and tip of a paler tint.

This remarkable species affords the type of a peculiar subdivision. It has a single tail of excessive length, while the anal appendage is narrow and linear. In these particulars as well as in the outline of the wings it approaches the individuals of the first subgenus, the true *Theclæ;* the club of its antennæ is also slightly attenuated at the extremities, but in its markings it greatly resembles the species arranged in the third subdivision of *Amblypodia,* particularly *Apidanus* and *Eumolphus.* Some uncertainty therefore remains as to its true situation in the series and many intermediate forms are wanting to complete a regular succession of affinities.

††††† *Caudis duabus mediocribus subæqualibus, dente marginali conspicuo: appendiculo anali rotundato producto.*

37. Amblypodia Vulcanus. *Alæ suprà fuscæ cano fimbriatæ* maris *violaceæ subnitentes; anticæ striolis quatuor abbreviatis inæqualibus undulatis fulvis, posticæ plagâ anali fulvâ ocellis duobus atris notatâ, interiore lunulæ argenteæ subjecto: subtùs sulphureæ, fasciis latis fulvis, seorsùm strigâ argenteâ medianâ interruptâ ornatis lineâque nigrâ subundulatâ limbatis; fasciæ anticarum sex, duabus apicalibus completis margini parallelis exteriore inornatâ, tertiâ subdimidiatâ, quartâ completâ in area costali strigâ abbreviatâ auctâ, indeque extrorsùm bifidâ, quintâ subdimidiatâ in area anali abruptâ, sextâ basilari obliquâ minimâ; posticæ fasciis sex, duabus marginalibus, quarum exteriore interruptâ, secundâ completâ arcuatim ad marginem interiorem productâ, tertiâ dimidiatâ cum secunda ad medium juncta, quartâ et quintâ completis in regione anali subito inflexis, sextâ angustâ basilari corpori contiguâ; regione anali fulvâ punctis duobus ocellaribus aterrimis fretâ.* (Exp. alar. 1 unc. 3 lin.)

Papilio P. R. Vulcanus. Fab. Mant. Ins. tom. 2. p. 66. No. 622.
Papilio Etolus. Cram. pl. 208. fig. E.F.
Polyommatus Vulcanus. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 644.
Papilio Vulcanus. Donov. Ind. Ins. (with a figure.)
Hospitatur in Musæo Dom. Banks.

38. Amblypodia Lohita. *Alæ suprà sordidè fuscæ canescenti-nebulosæ, cano fimbriatæ,* maris *saturatiores; anticæ e basi ad medium, posticæ paginâ totâ violaceo-micantes;* fœminæ *fasciis paginæ inferioris obsoletè strigosæ; posticæ insuper plagâ anali triangulari fulvâ, lunulis duabus atris, intùs argenteo-irroratis fretæ; lunulâ interiore majore subocellari, appendiculo ipso impositâ: subtùs flavæ, fasciis fulvis, in mare puniceis, margine simplicibus, singulis strigâ medianâ argenteâ continuâ vel parum interruptâ ornatis; anticæ fasciis septem, duabus marginalibus completis, exteriore inornatâ, tertiâ et quartâ abbreviatis pone discum confluentibus, quintâ completâ angulum analem versus tendente, sextâ dimidiatâ tæniâ fuscâ areæ analis dilutioris terminatâ, septimâ basali minimâ; posticæ fasciis sex, duabus exterioribus margini parallelis, secundâ completâ versus marginem interiorem*

riorem arcuatim productâ, tertiâ dimidiatâ, quartâ et quintâ completis in regione anali abruptè inflexis, sextâ basilari abbreviatâ; regione anali lætè fulvâ, punctis ocellaribus duobus aterrimis fretâ, exteriore caudis intermedio oblongo tæniâ argenteâ intus aucto, intimo majore appendiculo ipso imposito angulari strigâ argenteâ brevi interiore ornato. (Exp. alar. 1 unc. 3 lin.)

39. Amblypodia Syama. *Alæ suprà fuscæ canescenti-nebulosæ fasciis paginæ inferioris obsoletè notatæ, angulo anali posticarum fulvo punctis duobus aterrimis freto, exteriore maximo subocellari, singulis intùs striolâ argenteâ auctis;* maris *areâ anali anticarum paginâque ferè totâ posticarum violacco micantes: subtùs sulphureæ, fasciis nigris strigisve argenteis intermediis continuis vel interruptis; anticæ fasciis sex, duabus marginalibus completis, exteriore inornatâ, tertiâ dimidiatâ cui quartâ brevissimâ parallelâ, quintâ completâ angulum analem versus tendente dimidio posteriore dilatiore et denique attenuato, sextâ dimidiatâ tæniam fuscam areæ analis attingente, giturâ insuper basali longitudinali atrâ; posticæ fasciis quatuor, marginalibus parallelis, exteriore abbreviatâ interruptâ, secundâ arcuatim trans regionem analem marginem interiorem petente, tertiâ dimidiatâ, quartâ completâ in regione anali abruptè inflexâ et ad marginem internum longè protensâ, maculis insuper tribus in serie interiore ordinatis singulis puncto centrali argenteo fretis et denique maculâ basali triangulari corpori contiguâ; regione anali lætè fulvâ punctis duobus aterrimis ocellatâ interiore orbiculari maximo appendiculo ipso imposito, singulis intùs striolis argenteis auctis.* (Exp. alar. 13 lin.)

Hospitatur in Mus. dom. Banks.

Two of the species last enumerated were united by Fabricius under the name of *Vulcanus,* as appears from the Banksian Cabinet, now preserved at the Linnean Society, where our *thirty-ninth* species is marked with a ticket in Fabricius' own writing, while the detailed description of *H. R. Vulcanus,* in the Entom. System. Emmend. iii. p. 264 evidently depicts our *thirty-seventh* species, which has therefore a prior right to that name. This species is also contained in the Banksian Cabinet.

The materials in the collection at the India-house, from Java and Continental India, have enabled me clearly to discriminate *three* species, and I have endeavoured to exhibit the most prominent characters of each. This discrimination does not rest on the examination of a single specimen, or of one sex only: of No. 37, *Amblypodia Vulcanus,* wc have four specimens: of No. 38, *Amb. Lohita,* three, two males and one female; and of No. 39, *Amb. Syama,* two specimens, one of each sex; most of these are in a perfect state of preservation. I shall concisely sketch the peculiarities of each.

Amblypodia Vulcanus, No. 37, is prominently marked above, in the fore wings of both sexes, by *four short unequal waving striolæ of a fulvous colour:* underneath, in the fore wings the *third* band is short, *tending towards and touching the second band;* the *fourth* is complete and has, *at the costal extremity, a short accessary band,* whence it appears to be *bifid* exteriorly; in the hinder wings the *third* band is dimidial and loosely *united, behind the base, with the second;* but the most striking distinctive character of this species is *a deep black marginal thread, which passes in an undulated course along the edge of all the broader bands.*

Amblypodia Lohita, No. 38, has the upper surface brown, slightly variegated with gray, especially in the female, and marked with a few obsolete bands, of a deeper tint: underneath the

bands,

bands, comparatively with No. 37, are narrow, and wholly without any black marginal thread; the bands in the fore wings are *seven* in number, besides an obsolete angular basal spot, *the third and fourth are abbreviated converging approximate or confluent behind the disk;* in the hinder wings the *third is dimidial regularly transverse and without any tendency to the second marginal band:* in the character of the fourth and fifth band this species agrees with the former while both differ decidedly from the following.

Amblypodia Syama, No. 39, agrees in the upper surface with our last species: underneath the wings are sulphureous-yellow and marked with *bands of a black colour,* while the intermediate argentine strigæ are partially interrupted; in the fore wings *the third and fourth bands are parallel; the third* is dimidial *deeply indented* on each side *in the middle; the fourth is greatly abbreviated; the fifth is complete, somewhat distended in the middle and then tapering to a point,* having a general tendency to the inner apical angle; *at the base is a short longitudinal litura;* the hinder wings have *four bands;* the third, from the posterior margin, is dimidial, *the fourth forms a sudden curve in the anal region and then ascends along the whole course of the inner margin,* until it terminates at the thorax; interior of this are *three oblong marks,* individually ornamented with *a silvery dot,* disposed in a regularly transverse series, and finally at the base, a triangular spot, touching the thorax.

In all these species the *wings* of the male are adorned with a violet varying tint, spreading over the whole surface of the hinder pair, but confined to the anal area of the fore wings. Underneath the transverse bands are marked in all, with a continued or interrupted medial silvery striga. The two posterior bands are always regularly parallel with the margin. In the distribution of the other bands, the *third* and *fourth,* in the fore wings, present in each species a decided difference: and the minor modifications peculiar to each are detailed in the Latin description. The *abdomen,* in all these species, is marked with distinct yellow bands; the *tails* are long, slender, orange at their union with the anal angle, brown or black in the middle, and white at the extremity. The brown *antennæ* have a ferruginous tip, and very minute, close, dusky bands on their filiform portion. These three species further resemble each other in the orange-coloured termination of the *anal angle,* which is separated above from the adjoining portion of the surface, by a regularly oblique boundary, but is gradually diffused, and of a brighter tint underneath, while both surfaces are marked with two *ocellate spots* of intense black, the interior being round and lunular, slightly diversified in the different species, and adorned by a short streak or arc of silvery irrorations, the exterior one, between the tails, oblong, transverse, and surmounted at the inner edge, by a large oblong shining group of metallic dots.

40. Amblypodia Rochana. *Alæ suprà* maris *nigræ, anticæ plagâ oblongâ, posticæ plagâ ambitui alæ subconformi ad basin profundè emarginatâ secundum aspectum cyaneâ vel saturatè thalassino micante: subtùs badiæ, posticæ saturatiores in puniceum vergentes, areâ anali anticarum dilutiore posticarum canâ; anticæ ad basin lineâ attenuatâ—, tunc in disco stigmate brevi—, pone medium fasciâ arcuatâ ex maculis minutis cuneatis intermediâ sagittatâ introrsùm longissimè cuspidatâ et intrà marginem strigâ lunularum—, posticæ arcu humerali plagâque maximâ basilari irregulariter oblongâ, costam versus dilatiore rotundatâ, extùs profundè sinuatâ intùs appendiculo lineari ad angulum rectum divergente auctâ—, tunc strigâ totam paginam arcuatim excurrente ad costam e maculâ oblongâ oriundâ, in disco notis cuneatis efformatâ et versus marginem interiorem bifidâ—, posticè denique strigâ duplici maculas oblongas includente omnibus nitidè-niveis:

niveis: in regione anali tæniâ oblongâ exteriore margini parallelâ, maculâ orbiculari lobo anali impositâ striolisque ad marginem interiorem duabus aterrimis, tæniâ denique oblongâ punctis albis irroratâ inter caudas mediâ. (Exp. alar. 1 unc. 5 lin.)

Wings above, in the *male*, black, the *anterior* with an oblong patch, the *hinder* with a large area nearly circumscribed according to the outline of the wing, deeply notched at the base and separated by a narrow curved border from the posterior margin, deep cyaneous blue, or reflecting in a different light a beautiful sea-green lustre: *underneath* dark reddish brown, the *hinder* covered with a shining bay reflexion; the anal area paler and clouded, in the *fore wings*, uniformly gray, and defined in the form of a regular arch in the hinder pair; the surface of both pairs bearing diversified marks of a beautiful shining silvery white, arranged in the following manner: in the fore wings a narrow white line, attenuated towards the base extends near the inner boundary of the costal area about one-third of the wing; on the disk stands a very short transverse stigma; behind this follows a curved interrupted band of five wedge-shaped dots, of which the intermediate one is greatly lengthened and sagittiform, and, near the posterior margin, a gently curved striga of minute arcs: the hinder wings have a delicate dash at the inner costal curve, then a very large oblong longitudinally disposed spot with irregularly defined edges, narrow at its basal extremity, enlarged into a rounded head as it approaches the middle of the costal margin, the exterior edge being deeply sinuated and the interior produced into a lengthened process stretching at right angles to the disk; behind this an irregular striga extending in an arch across the entire surface at the anterior boundary of the gray anal area, commencing near the middle of the costa with a large irregular dot, continued over the disk by four or five wedge-shaped marks, and then passing in two slightly diverging acutely flexuose lines to the inner margin; lastly near the hinder margin a double striga, the interior one undulated, enclosing a few oblong reddish brown marks terminating near the external tail, all of a shining white tint, being succeeded by a large oblong transverse patch of a deep black colour and a stripe closely dotted with white, both which are regularly parallel with the posterior margin, while the anal appendage itself is covered by a large circular black spot, and two marks of the same colour, edged with white, are disposed along the oblique portion of the inner margin. The *body* is brown above and hoary underneath; the *antennæ* are uniformly brown to a short ferruginous tip; the black *tails* have a delicate medial line and a white extremity.

A single male specimen is contained in our museum.

41. Amblypodia Jalindra. *Alæ suprà* fœminæ *fuscæ, anticæ immaculatæ, posticæ plagâ latissimâ, angulum apicalem anteriorem non attingente dilutè azureâ ex argenteo nitente, maculis tribus oblongis submarginalibus interiore saturatiore adjectis; appendiculo anali lunulâ viridi-argenteâ irrorato; strigâ marginali fimbriâque niveis, lineâ aterrimâ in regione anali flexuosâ intermediâ: subtùs basali parte dimidiâ lacteâ, apicali fuscâ dilutè violaceo fucatâ, in anticis strigâ undulatâ medianâ niveâ fretâ, plagâ apicali dilutiore angulo anali canescente, in posticis fasciâ latâ marginali albâ, maculis oblongis obsoletis canis et in regione anali ocellis duobus maximis orbiculatis aterrimis notatâ, quorum exteriore lunulâ saturatè fulvâ introrsum radiatâ, interiore appendiculum analem ipsum occupante iride lætâ viridi-argenteâ cincto; maculâ circulari punctis argenteis irroratâ ocellis intermediâ; striolis duabus obliquis abbreviatis notâque angulari formam*

formam V *mentiente illis intermediâ nigris, in serie marginem interiorem petente ocellisque parallelâ digestis.* (Exp. alar. 1 unc. 7 lin.)

Polyommatus Nedymond. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 634.

Wings above, in the *female,* pure brown, the *anterior* immaculate, the *hinder* with a broad oblong posterior band of a pale azure tint, varying according to the aspect to pale sea-green with a silvery reflexion, bearing at the exterior edge three oblong black marks, of which the interior one has the deepest tint, the whole being bordered externally by a white marginal line, separated from the fringe of the same colour by an intermediate black thread which is flexuose in the anal region; the anal appendage bears a lunule covered with silvery sea-green resplendent dots: *underneath* the basal dimidial portion of the surface is satin-white, the apical portion *brown with a slight violet shade;* the latter is further subdivided, in the *anterior* wings, by an *intermediate abbreviated undulated white striga,* the posterior half being paler and the whole of the *inner apical angle gray;* in the *hinder* wings the *marginal portion is white and marked with four obsolete gray spots,* fainter as they recede from the outer apical angle; *the anal region is white and bears two* very large, strongly pronounced, intensely black *circular ocellate spots,* with an *intermediate round group of greenish silvery irrorations;* the *exterior ocellus bears internally a broad orange lunule spreading in a radiant manner towards the disk; the second ocellus* occupies the anal appendage itself and is *entirely surrounded by a narrow annular iris of a pale green silvery tint; parallel with the ocelli three delicate black marks are arranged in a series, the intermediate one forming an angular mark resembling the letter* V, the lateral ones constituting two short oblique striolæ; a very faint oblique bifid streak stretches from the inner ocellus towards the anal angle. The *body* is brown above and white underneath; the *antennæ* are brown with a ferruginous tip and marked underneath with delicate bands alternately white and brown; the *tails* are white very delicately fringed at the sides, and marked longitudinally with a distinct black medial line.

This highly beautiful species, originally described in the Encyclopédie, has not, as yet, to my knowledge been figured in any work. I have already stated my reasons for applying the name of *Nedymond,* by which it is designated in the Encyclopédie, to our 28th species (see above, p. 98); and I have, in the preceding description, directed the attention of the reader to the markings on the under-surface, which discriminate this species, by printing them in italics. Besides these particulars which relate only to colour and painting, our insect differs likewise in form and belongs to a different section of this subgenus. The anal appendage is rounded and the wings are provided with two tails.

42. Amblypodia Longinus. *Alæ suprà* maris *cyaneæ argenteo-micantes, nitore saturato variabili, limbis apiceque largissimo anticarum nigris;* fœminæ *sordidè albæ basi tantum azureo irroratæ, anticæ limbis fuscis, posticæ margine anteriore discoque fusco-nebulosis, seriebus insuper duabus punctorum, margini apicali parallelis, strigâque extimâ nigris, maculis duabus areæ analis oblongis insignioribus: subtùs sericeo-griseæ serie communi posticâ ex arcubus minutis nigris in anticis continuâ in posticis subflexuosâ, notâ insigniori angulari in regione anali plagæ ocellulis intermediæ oppositâ; anticæ insuper strigâ obsoletâ margini parallelâ ex maculis oblongis canis albido limbatis, posticæ strigâ conformi geminâ et deinde in regione anali ocellis duobus atris alterâ exteriore minore orbiculari in plaga maxima fulva intùs subquadrata nidulante*

lante, altero maximo appendiculo anali imposito intùs lunulâ fulvâ extùs strigâ tenui argenteo-irroratâ auctâ, plagâ denique circulari punctis argenteis obsoletioribus aspersâ ocellis intermediâ. (Exp. alar. 1 unc. 5—7 lin.)

Hesperia R. Longinus. Fab. Ent. Syst. Em. Suppl. p. 430. No. 77-78.

Polyommatus Longinus. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 634.

Plate I, fig. 7.

Wings above, in the *male*, cyaneous blue, with a saturated silvery reflexion changing according to the light to sea-green, the borders throughout and the exterior dimidial portion of the *fore wings*, defined by a boundary extending obliquely across the disk, being black, the inner excavated margin of the *hinder wings* gray; in the *female* sordid white, all the wings with pale azure silvery irrorations confined to the base, fore wings with broad brown borders, hinder pair faintly clouded with brown and paler anterior margin, bearing two rows of minute black spots parallel with the posterior margin and an extreme black thread; the two interior spots of the exterior series being larger more pronounced and succeeded by an obsolete brown lunule on the anal appendage; *fringe* throughout gray: *underneath* satin-gray with a common striga of minute black arcs, beyond the middle, regular and disposed in close contact in the *fore wings* flexuose and farther removed from the margin in the *hinder* pair, interrupted by a more conspicuous arc or angular mark in the curve at the anal region, opposed to the medial space between the tails; the fore wings have besides between the principal striga and the margin a regular series of very obsolete oblong grayish spots faintly margined with white; this is continued in the hinder wings by a double series of the same kind with more distinct spots and followed in the anal region by two intensely black ocellate spots, the exterior one near the marginal notch being small regularly circular and bedded in a large fulvous patch with an abruptly transverse interior edge, the other ocellus occupying the anal appendage, being oblong-transverse, bordered internally by a fulvous lunule and ornamented externally by a narrow metallic streak; between these is a round group of delicate silvery irrorations on a hoary ground. The *tails* are black with white edges and tips; the *antennæ* brown with a ferruginous tip, and marked on one side with delicate transverse grayish dots. The *body* is covered with a bluish sea-green down above and with delicate white hairs underneath.

Amblypodia Longinus deviates both in the larva and imago states from the species described in the third section, which I consider as typical in this subgenus. The larva is considerably distended anteriorly, excavated at the sides, contracted behind and transversely swelled at the segments (see Plate iv. fig. 5). In the imago state the peculiarity chiefly exhibits itself in the antennæ, which are abruptly terminated by a short point (see Plate iv. fig. 5, c.). In the character of the anal appendages and of the tails, the various species arranged in this section generally agree, with the exception of *Amblypodia Etolus;* but nothing is as yet known of their metamorphosis; and the investigation of the larva forms of this subgenus, which is so much diversified in the imago state, deserves the closest attention of Entomologists in foreign countries.

Amblypodia Longinus is not unfrequent, and I obtained six male and five female specimens chiefly by breeding: the larva feeds on a species of *Loranthus*, which grows parasitically in great abundance on the Mango and other fruit trees surrounding the villages of the natives. The discoidal litura, represented in the figures, does not appear in all our specimens.

43. Amblypodia Erylus. *Alæ suprà fuscæ* maris *saturatiores, salvis lineâ marginali singularum maculâque discoideâ anticarum nigricantibus, cyaneo mutabili saturato micantes;* fœminæ *canescenti-fusco nebulosæ, fasciâ saturatiore communi pone discum, in posticis flexuosâ et in regione anali plagâ abbreviatâ*

abbreviatâ albâ conjunctâ, ocellisque duobus aterrimis albo annulatis maculâque fuscescente in appendiculo anali; lineâ denique marginali albâ undulatâ in utroque sexu: subtùs argenteo-griseæ, singulæ liturâ geminâ discoideâ fasciâque communi insigni, in anticis strictâ, in posticis subinfractâ, in regionè anali flexuosâ notâque angulari interstitio ocellarum oppositâ rufescentibus, lineis niveis utrinque limbatis; intra marginem posticum strigâ ex maculis oblongis obsoletè fuscis in anticis simplici completâ, in posticis duplici dimidiatâ in regione anali ocellis duobus aterrimis fretâ, altero exteriore lunulâ aurantiâ intùs obducto, altero appendiculo anali imposito, tæniâ albo-irroratâ ocellis intermediâ; tunc strigâ niveâ undulatâ ad medium alæ extensâ et denique lineâ atrâ cano-fimbriatâ marginem legente. (Exp. alar. 1 unc. 2—6 lin.)

Polyommatus Erylus. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 633.

Wings above brown, in the *male* more saturated and covered with a very rich cyaneous blue lustre which disappears almost entirely in a certain direction to the light; a narrow border in both wings and a large discoidal spot in the anterior pair always preserve the original ground colour inclining to blackish; in the *female* the tint is without blue lustre and slightly clouded with grayish brown, a saturated brown band passes a little behind the disk through both pair, being flexuose in the hinder and accompanied in the anal region by a subdimidial arched band consisting of a series of confluent broad white spots; behind this a very faint narrow band passes in a curve across the whole wing, and close to the margin is a somewhat more distinct row of spots originating at a small distance from the outer apical angle enclosed by two delicate white strigæ being continued in the anal region by two very large deep black ocelli, encircled by white rings, while a fainter ferruginous spot covers the anal appendage; the latter also appears in the male and a brilliant white marginal thread winds in both sexes along the anal region, exterior to which is a black marginal thread while the wings are uniformly terminated by a grayish fringe: *underneath* the wings are silvery-gray with a faint glaucous cast; on the disk of each pair stands a short double reddish-yellow litura; behind this follows a more distinct and saturated common band of the same colour, narrowly edged on both sides with brilliant snow-white lines, nearly straight with an oblique outward tendency in the fore wings but slightly interrupted and flexuose in the hinder wings; then an angular mark resembling the letter V standing at the curve in the anal region, from which a detached line passes obliquely to the inner margin, having a fainter line parallel to it at the extreme boundary; between this band and the extreme margin passes a connected series of obsolete brown marks which is complete in the fore wings and subdimidial in the hinder pair, being followed in the anal region by two very large black circular ocelli separated by an intermediate oblong group of white dots, which are crowded more distinct and brilliant in an attenuated transverse streak adjoining the interior ocellus; the latter occupies the anal appendage itself and is bordered internally by a narrow white arc while the exterior ocellus is surrounded by a very large orange lunule; posteriorly both ocelli are bordered by a brilliant white waving marginal line exterior to which is a black thread and gray fringe. *Body* brown above, hoary underneath: *abdomen* marked laterally with white bands. *Antennæ* brown with a ferruginous tip, and delicate white bands along the filiform basal portion. *Eyes* covered with a delicate ferruginous down and edged posteriorly with white. *Legs* covered with a white down and marked with black bands.

This species occurred occasionally in my breeding-cages; as the larva was not delineated I conclude that it is nearly allied in form and appearance to the other larvæ of this genus. Our specimens are one male and two females. The authors of the Encyclopédie have given the first description of this species.

44. Amblypodia

44. Amblypodia Jangala. *Alæ suprà brunneæ immaculatæ, posticæ margine interiore abdomen excipiente sericeo-cano, appendiculo anali lunulâ ferrugineâ freto strigâque posticâ albâ et denique fimbriâ nigrâ cincto: subtùs ferrugineo-fuscescentes nitore glauco in purpureum vergente lavatæ, areâ anali anticarum dilutiore; singulæ liturâ discoideâ geminâ saturatâ abbreviatâ; pone discum strigâ communi ex lineolis brevibus rectis contiguis, in anticis strictâ dimidiatâ in posticis ad marginem anteriorem fractâ tunc undulatâ et in regione anali interruptâ creperisque canescentibus limbatâ; maculis ocellaribus duabus orbiculatis maximis saturatè fuscis ferrugineo-nitentibus, plagâ albo-irroratâ distinctis, posticè strigâ niveâ margini parallelâ circumscriptis; notis quatuor viridi-aureo nitentibus in serie ocellis interiore digestis, primâ marginis medio parallelâ, secundâ arcum formante super ocellum exteriorem, tertiâ angulari ocellis intermediâ, quartâ attenuatâ ab ocello interiore ad marginis medium ferè prolatâ.* (Exp. alar. 1 unc. 2½ lin.)

Wings above uniformly dark brown, with a very faint varying purple reflexion; inner margin of the hinder pair silky gray; anal appendage bearing a saturated ferruginous lunule and confined exteriorly by a white arc, behind which is a delicate black line gradually evanescent towards the marginal notch; a gray fringe surrounds the margins of all the wings: *underneath* ferruginous brown with a glaucous gloss changing to purple according to the direction of the light; anal area of the *forewings* ferruginous gray; disk of all the wings marked with a short double brownish litura; between this and the posterior margin follows a delicate but distinct brown striga with a purple gloss, consisting of minute linear fragments which in the fore wings are regular and contiguous, forming a slightly curved striga commencing at a small distance from the costa and terminating at the anal area; in the *hinder* pair this striga passes over the whole surface, being broken at the costa, slightly waving in the middle region, and then passing, after several interruptions, to the inner margin, being marked in the anal region exteriorly with several whitish angular clouds; the whole of the anal portion of the wing is covered with a saturated ferruginous band continued obliquely to the anterior apical angle, regularly defined interiorly, and bearing exteriorly at the margin two very large circular spots, ferruginous-brown, varying to purple and separated by a group of white atoms: the inner edge is ornamented with four delicate emerald-green marks with a golden lustre, the first near the middle of the margin being short and linear, the second forming a semicircular arc above the exterior ocellus, the third opposed to the intermediate group of atoms being angular or resembling the letter V, the fourth forming a minute lunule over the interior ocellus from which it is continued one-third of the length of the inner margin; exteriorly the anal region is bordered by a delicate grayish thread, beyond which a brownish fringe extends along the wings. *Body* brown above, pale ferruginous gray underneath, *antennæ* brown with numerous white bands on one side, *tails* black tipt with white.

A single female specimen is contained in our collection.

45. Amblypodia Vidura. *Alæ suprà* maris *lætè azureæ argenteo-relucentes nitore mutabili dilutè thalassino; anticæ penicillo insigni sericeo-albo inflexo punctoque nigro in imo disco adpresso, marginibus apiceque largè atris limite interiore arcuato circumscriptis, posticæ margine apicali lunulâque in appendiculo anali nigris cano-fimbriatis, canali abdomen recipiente albo villis sericeis canescentibus vestito: subtùs canescenti-fuscæ nitore pallidè argenteo micantes,*

 fasciâ

fasciâ communi medianâ niveâ valde insigni strictâ in regione anali posticarum attenuatâ flexurâ tenui arcuatâ et strigâ obliquâ ad marginem interiorem ductâ ; tunc strigâ communi nigricante gracillimâ ex lineolis abbreviatis conflatâ, disco et margini postico intermediâ, in anticis continuâ subarcuatâ in posticis interruptâ in regione anali flexuosâ fasciam niveam legente et ad marginem interiorem excurrente ; intra marginem posticarum in dimidio costali serie obsoletâ punctorum oblongarum strigis binis niveis amplexâ ; dimidio anali vero maculis duabus orbiculatis aterrimis maximis plagâque nigro irroratâ intermediâ freto ; ocello exteriore plagâ oblongâ aurantiâ maximâ intùs quadratâ obducto, altero appendiculo anali imposito intùs arcu niveo et strigâ brevi obliquâ ad marginem productâ stipatâ, strigâ denique tenui niveâ canofimbriatâ secus marginem imum excurrente. (Exp. alar. 1 unc. 6 lin.)

Plate I, fig. 6 ; 6, a.

Wings above, in the *male*, bright azure with a snowy refulgence spread as a delicate white powder over the surface, while the ground colour assumes in a different aspect a pale sea-green cast ; the *fore wings* are ornamented with a delicate white silky brush-like appendage, reflected and closely applied to a blackish spot on the middle of the disk ; the margins are black, gradually increasing in breadth to the tip, being separated by a curved boundary from the azure ground ; in the *hinder wings* the posterior border is marked with a black thread extending to the anal appendage, which bears besides a black lunule ; the extreme fringe is gray ; in the exterior margin is a hemispherical denudated silvery spot, corresponding with a delicate brush of lengthened hairs in the under side of the fore wings ; the interior border is covered with a delicate whitish down, slightly fringed with gray : *underneath* the wings are grayish brown with a very faint livid lustre ; a strongly pronounced broad snow-white band passes in a straight line through the middle of both pair to the anal region of the hinder wings, where it becomes narrower, and after several minute curves, stretches obliquely to the interior margin ; between this and the hinder margin is a very delicate blackish thread composed of small linear fragments, in close contact, arranged in a regular curve across the fore wings, slightly interrupted and curved in the hinder, forming in the anal region a delicate edge along the medial white band ; the hinder wings are further marked within the posterior margin with a row of oblong spots of the ground colour enclosed within a double series of white lunules, and continued in the anal region by two very large circular black ocellate spots, the exterior one being surmounted by a large oblong patch of a bright orange tint abruptly terminated at its contact with the black striga, the interior onc occupying the anal appendage, being covered internally with a white arc sending off a short oblique line along the inner margin ; the space between the ocelli is gray, irregularly irrorated with black and marked in the middle by an indistinct white lunule, a brilliant white thread passes along the entire anal region, exterior to which is a continued black marginal thread, and finally a grayish fringe. *Body* with a varying bluish or sea-green tint above, covered with a yellowish down underneath ; *antennæ* brown, with a closely catenulated lateral white line extending to the origin of the club, the tip of which is ferruginous ; *tails* black with a white tip and grayish fringe.

This species, as appears from a drawing in the possession of General Hardwicke, is also found on the continent of India. In Java it is comparatively rare, a single male specimen was brought to England.

46. AMBLYPODIA ETOLUS. *Alæ suprà anticæ nigræ basi cærulescente, posticæ cærulescentes angulo apicali exteriore punctisque duobus analibus distantibus nigris: subtùs anticæ testaceo-fuscæ salvâ basi obliquè definitâ cærulescente, strigis tribus saturatioribus, anteriore abbreviatâ geminâ discoidali, alterâ medianâ insigni ad aream analem abruptè terminatâ, tertiâ obsoletâ ferè completâ margini apicali parallelâ anticè evanescente; posticæ pallidè cærulescentes puncto insigni aterrimo albo cincto versus basin ad costam sito; tunc pone discum strigâ tenui interruptâ ex lineolis ferrugineis et in regione anali ex notis nigris flexuoso-undulatis lineâque interiore obliquâ ad marginem interiorem tendente; intra marginem posticum denique serie duplici ex strigis ferrugineis juxta angulum exteriorem diffusis indeterminatis versus medium attenuatis, strigâ interiore in regione anali puncto oblongo nigro definitâ, exteriore vero in eadem regione maculis duabus maximis ocellaribus aterrimis tæniâque marginali albo irroratâ intermediâ efformatâ; liturâ insuper marginali attenuatâ introrsum cuspidatâ punctis viridi-argenteis irroratâ ocello interiori adnatâ; margine extremo lineâ atrâ undulatâ albo-fimbriatâ limbato.* (Exp. alar. lin. 13.)

Papilio P. R. Etolus. Fab. Mant. Ins. tom. 2. p. 66. No. 620.
Polyommatus Etolus. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 639.

Anterior wings above black with a bluish base, *hinder* wings light blue and silvery, with an oblong abbreviated black patch at the outer apical angle and two circular distant subocellate black spots in the anal region: *underneath* greatest portion of the surface of the *fore wings* testaceous brown, separated by an oblique boundary from the bluish base; surface marked with a short double litura on the disk, a distinct abbreviated medial and a very faint almost complete posterior band, all these marks having a more saturated brown tint than the ground; *hinder wings* pale blue, with a whitish lustre, bearing near the base, in contact with the costa, a very distinct black dot enclosed in a faint white ring; then, behind the disk, a very delicate striga of interrupted ferruginous lineolæ followed in the anal region by an irregularly flexuose black line passing obliquely to the inner margin; posterior margin marked with a double series consisting of two parallel ferruginous strigæ, clouded and diffuse at the outer apical angle, attenuated towards the middle of the wing, the interior of these strigæ terminating by a distinct oblong dot between the ocellate spots, the exterior bearing a small black dot at the middle of the margin, after which follow in the same line two very large intensely black round ocellate spots with an intermediate group of white irrorations, which are more thickly disposed and covered with a greenish silvery cast on a black wedge-shaped dash at the edge of the inner ocellus, having its point directed towards the disk. *Body* brown above, sparingly clothed with bluish hairs, whitish and downy underneath; *antennæ* brown, delicately annulated with white to the club, which is terminated by a ferruginous tip; *legs* banded alternately white and black.

Fabricius alone, as far as I have observed, has hitherto given a description of this species; it is therefore important to confirm his very concise indication by the more detailed description of a specimen in excellent preservation. Being peculiar in its sectional character, it is accordingly placed at the end of the series described; and it remains to be determined whether it be really a distinct type, or whether the hiatus remaining may be supplied by intermediate forms. Several peculiarities in the form, painting, and external habit of this species lead us to those insects which will be described in the next genus.

Genus MYRINA. *Fab. Latr.*

CHARACTER. *Larva* / *Chrysalis* } hactenus incognitæ.

Imago: *Antennæ* mediocres, sensim incrassatæ, capitulo cylindrico vix subarcuato, apice acuto; basin versus introrsùm sulco leviter crenulato exaratæ, articulis extremis parcè setosis.

Palpi elongati, stricti, compressi, graciles, parum divergentes, antennis longitudine tertiâ parte æquales; articulo basilari brevi, capiti adnato, fasciculo ovato ex villis sericeis vestito; articulo secundo elongato, oblongo, ultra basin capite soluto, assurgente, villis densis, teneris, æqualibus deorsùm versis arctè obtecto; articulo tertio teneri, oblongo, obtuso, rectè porrecto, villis brevissimis obsito.

Proboscis dilatatus, palpis longior, apice latere altero setis crebris brevibus munito.

Caput breve, obtusum. *Oculi* planiusculi, nudi. *Corpus* breve, acutum. *Alæ* anticæ oblongæ, obtusæ; posticæ versus regionem analem angustiores, subtruncatæ, appendiculo anali brevi caudisque rectis munitæ. *Pedes* antici tarsis pro sexu diversis; maris articulo solitario, cylindrico, attenuato, obtuso, squamis minutis annulatis arctè obtecto, subtùsque villis adsperso; fœminæ quinque-articulatis, attenuatis, squamulis minutis annulatim ordinatis vestitis, subtùs setis quoque adspersis, articulo primo tumidiore, extimo unguibus duobus minimis, appendiculis utrinque lateralibus et pulvillo intermedio prædito, serie denique terminali villorum apicem occultante: pedes medii et postici in utroque sexu unguibus duobus minimis, appendiculis lateralibus et pulvillo intermedio muniti.

CHARACTER. The *larva* and *chrysalis* as yet unknown. In the perfect insect: *Antennæ* of moderate length increasing gradually in thickness to a cylindrical club which tapers to a short point; basal portion with an obsolete internal groove transversely crenulated, while the extreme joints are marked with minute bristles. *Palpi* straight, compressed, slender; measuring one-third at least the length of the antennæ: basal joint short, closely applied to the head, covered by a tuft of delicate silky hairs; second joint long, oblong, projecting far beyond the head, gradually tending upwards, closely covered underneath with silky hairs uniformly pointing downwards; third joint slender, oblong, obtuse, pointing forward, covered with a very minute, short down. *Proboscis* broad, longer than the palpi, with short bristles at the extremity. *Head* short, obtuse. *Eyes* not prominent, even, naked. *Body* short, acute. *Wings: anterior* oblong, obtuse; *posterior,* attenuated towards the anal region, abruptly truncated, with a short anal appendage and straight tails following the direction of the wings. *Feet:* anterior of the *male,* with tarsi consisting of a single, subcylindrical, attenuated, obtuse joint, covered with minute scales, arranged in alternate rings of different colours, among which, underneath, stiff bristles are also scattered; the extremity being blunt, incurved, without claws, but provided with several stiff bristles: of the *female,* with tarsi consisting of five joints, the first thick and long, the rest gradually attenuated to the terminal one, which has two minute lateral claws, an appendage on each side, and an intermediate pulvillus, all which are concealed by a transverse series of hairs; the general hairy covering, and the bristles underneath, are similar to those of the males: the mid legs and hind legs, in both sexes are also provided with two minute claws, resembling in their appendages, pulvilli, and general structure the anterior feet of the female.

The illustrations given of this genus on the second plate of the first part, fig. 5, a; 5, b; 5, c; 5, d; 5, e; are by no means complete; several points, particularly those relating to the diversified structure

structure of the tarsi in the sexes, were ascertained since the arrangement of the plates of the first part for the engraver. These will be given in a future number.

The peculiarities of this genus and its relation to the genus next in order, will be pointed out after the description of that genus.

* *Alis posticis caudis tribus, intermediâ longissimâ, interiore mediocri, exteriore brevi denti marginali adhærente.*

47. Myrina Ravindra. *Alæ anticæ fuscæ immaculatæ,* maris *saturatiores nigricantes; posticæ in mare cyaneæ pulverulentæ vel in certa luce thalassino variabili micantes, relicto margine exteriore lato, postico angusto lineari, albo-fimbriato fuscis; in fœmina fuscæ, limbo angusto postico saturatiore; utroque sexu maculis tribus atris in regione anali in serie marginali digestis, interiore appendiculo anali impositâ, in fœmina lunulis diffusis pallidè cæruleis inductis, strigâ denique tenui nigrâ albo-fimbriatâ marginem posticum legente: subtùs anticæ canescenti-fuscæ areâ anali ad basin dilutiore, maculis fasciisque saturatioribus tenuissimè albo marginatis; maculâ interiore longitudinali in area mediana per tertiam partem paginæ extensâ, alterâ transversâ costam non attingente ante discum sitâ, tertiâ discoidali brevissimâ; tunc pone discum fasciâ ex striolis duabus diversæ indolis conjunctis efformatâ, exteriore simplici interiore dilatiore, albo-limbatâ; intra marginem denique serie simplici completâ rectâ lineolarum obsoletarum; posticæ albæ atro insigniter maculatæ; maculis duabus basilaribus elongatis parallelis costam non attingentibus, interstitio vero puncto oblongo versus costam tendente freto; tunc in medio serie trium macularum latè interruptâ duabus nempe exterioribus conformibus utrinque quadratis tertiâ discoidali latiore; pone discum serie costam non attingente ex maculis quatuor vel quinque difformibus interiore elongatâ insigniore versus discum anguli instar inflexâ ad marginem interiorem bifidâ; pone hanc strigâ tenui completâ ex lunulis striolisque in arcum subflexuosum per paginam totam ductâ et denique serie maculari posticâ intra marginem, maculis exterioribus tribus linearibus obsoletis interioribus quinque difformibus aterrimis seriatis analibus exterioribus oblongis, proximis hinc inde interioribus semilunaribus maximis alterâ in appendiculo anali alterâ in sinu marginis ad dentem exteriorem sitâ, quintâ denique obsoletiore intermediâ, singulis secundum ordinem, strigis lunulis et plagâ oblongâ viridi-argenteo irroratis inductis.* (Exp. alar. lin. 11—17.)

Plate I, fig. 11; 11, a.

Anterior wings above brown, more saturated in the *male*, posterior wings covered in the male with a cyaneous pulverulent glossy tint, varying according to the light to sea-green, increasing in strength to the hinder margin; a broad exterior and a narrow posterior border are brown, the latter having a snow-white fringe which also extends to the paler inner margin; in the *female* these wings are brown, with the exception of a few faint diffuse bluish lunules covering three semilunar black spots, which in this sex, as well as in the male, are arranged along the posterior boundary of the anal region: *underneath* the *fore wings* are grayish brown, with a whitish anal area, and marked with dark brown spots and bands enclosed by very delicate white edges; the first spot stands at the base in a longitudinal direction; before this are two transverse spots, the outer being very minute and occupying the disk; behind this follows a complete band, which is simple and slender exteriorly, but broad and margined in its interior dimidial portion; within the margin an obsolete series of interrupted lineolar fragments passes over the whole surface;

surface; the *hinder wings* are white, and marked on the base and disk with oblong black spots, in the following manner: the two interior near the base are lengthened parallel with each other, and bearing at their costal termination an intermediate black spot; near the middle, three oblong spots abruptly terminated at each end form a widely interrupted series, behind which follows another broken row of four or five spots, not extending to the costa, of which the interior one is lengthened, hooked at its discoidal extremity, and bifid at the inner margin; beyond this a delicate black striga composed of lunules and minute lines passes in an arch over the whole surface; the posterior margin itself is lined with a macular series, commencing with three exterior spots minute and simple, extending from the costa to the middle, being followed in the anal region by five diversified intensely black spots, one at each extremity being simple and oblong, the next adjoining internally on each side semilunar and large; of these, one is disposed on the anal appendage, the other at the marginal angle in the sinus, while the medial space is occupied by an oblong spot placed at a small distance from the margin; they are individually covered with greenish silvery atoms, corresponding in form to the spots to which they are applied, and forming by their union an undulate band stretching along the inner confines of the anal region. *Body* brown above, hoary underneath. *Antennæ* brown with a ferruginous tip, delicately crenulated with white along the lateral groove. *Legs* white, with distant black bands on the tibiæ, and numerous bands on the tarsi. *Tails* white, with a medial black striga.

This species greatly resembles *Hesperia R. Lisias* of Fabricius, of which a specimen is preserved in the Banksian cabinet. A clear distinguishing character is however afforded by the fore wings, which are uniformly immaculate in both sexes. Our collection contains numerous male and female specimens. In the painting of the lower surface this species still preserves an affinity to the individuals of *Amblypodia*, but in essential characters it rigidly agrees with *Myrina*, as above defined.

** *Alis posticis caudis duabus denteque marginali prominulo; caudâ exteriore longissimâ, interiore mediocri.*

48. Myrina Jafra. *Alæ suprà fuscæ* maris *cupreo saturato in violaceum vergente micantes; anticæ immaculatæ, posticæ regione anali atrâ, in mare maculis duabus niveis fretâ, unâ marginali lunari insigni, alterâ interiore oblongâ obsoletâ; in fœmina fasciâ niveâ insigni ex maculis tribus oblongis connatis efformatâ lunulâque insuper maximâ ad marginem posticum: subtùs albæ nitore diluto canescente lavatæ, anticæ limbis exteriore et postico striolâ tenuissimâ discoidali strigâque completâ posticâ undulatâ ex lineolis interruptis efformatâ ferrugineis, strigâ denique maculari intra marginem obsoletissimâ ejusdem coloris; posticæ pone discum strigâ tenuissimâ completâ nigrâ, e costa ad medium usque ex lunulis interruptis in regione anali vero ex notis arcuatis conflatâ; tunc strigâ tenui interruptâ completâ in arcum per totam paginam ductâ; posticè denique intra marginem serie macularum; maculis quatuor exterioribus oblongis obsoletis, interioribus quinque inæqualibus aterrimis, extremis nempe linearibus, proximis maximis angulatis subocellaribus, alterâ in sinu marginali alterâ in appendiculo anali dispositâ, quintâ oblongâ transversâ in spatio intermedio sitâ, singulis in ordine lineolis extremis lunulis plagâque intermediâ viridi-argenteis irroratis.* (Exp. alar. 1 unc. 5-7 lin.)

Plate II, fig. 5; 5, a.

Myrina Jafra. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 593.

Wings

Wings above blackish brown, the *male* covered with a beautiful saturated cupreous gloss slightly varying to purple; the *anterior* pair immaculate in both sexes, the *posterior* with the anal extremity black separated by a regularly transverse boundary, in the male marked with two white spots, one large, lunulate and marginal, the other oblong, narrow, and exactly opposed to the exterior one at the inner boundary of the anal region; in the female a broad snow-white band separates the anal from the middle region: it consists of three oblong spots, of which the exterior one is narrow and passes obliquely towards the margin; a very large lunule of the same colour occupies at the margin the extreme space between the tails: *underneath* the wings are white with a grayish shade covered with a slight lustre; the *anterior* pair have the exterior and posterior borders ferruginous, the tint being faint and diffuse interiorly but more intense in contact with the margin; a very delicate discoidal line, a complete undulated striga behind the disk composed of interrupted lineolæ, and a very obsolete row of spots within the posterior margin are of the same colour; the *hinder* wings have beyond the disk a very delicate black striga composed at the costal extremity of interrupted lunules, and in the anal region of arcuated marks disposed in regular succession; then follows a delicate interrupted streak passing in a curve over the entire surface of the wing, and exteriorly of this, just within the margin in the costal extremity, a macular series of four oblong obsolete brown spots followed by five diversified spots of an intense black tint pervading the anal region; the extreme ones on each side being linear, the next adjoining interiorly large, angular, subocellated, one of them being situated in the marginal series near the notch, the other on the anal appendage; the fifth, which is oblong and somewhat removed from the margin, occupies the medial space of the anal region; these spots are all covered along their inner edge by marks corresponding to their individual form of greenish silvery atoms, forming by their union an undulated streak passing along the inner boundary of the anal region. The *body* above and underneath agrees in colour with the adjoining portion of the wings; the *legs* are white with distant white bands, but the tarsi are closely banded; the *antennæ* are brown, with a faint grayish crenulation along the inner groove; the *eyes* are edged with white, and the palpi underneath are also white; the *tails* are white with a black medial streak. Besides the distinctions already enumerated, the male is marked above by a short white line at the extreme inner margin near the base, indicating the interior attachment of a small brush-like appendage.

We have two male and four female specimens of this species, which was first made public in the Encyclopédie. The authors of that work were acquainted with one sex only, which, agreeably to the preceding details, was the female; the distinguishing characters of the male are now, for the first time, given.

Genus LOXURA.

MYRINA. *MM. Latr. et Godt.*

CHARACTER. *Larva* / *Chrysalis* } hactenus latent.

Imago: Antennæ breves, strictæ, sensim incrassatæ, capitulo apice acuto basin versus haud manifestè distincto, sulco interiore longitudinali obsoletè crenulato, articulis exterioribus setis minutis cinctis.

Palpi longissimi, stricti, compressi, graciles, parum divergentes, antennarum longitudinis dimidiam partem æquantes; articulo basilari brevi capiti adnato, villis brevibus sericeis obtecto; articulo secundo

secundo longissimo, oblongo, latere superiore subarcuato, ultra basin a capite soluto, obliquè assurgente, villis tenerrimis vestito; articulo tertio mediocri, attenuato, subfalcato, vix nutante, villis brevissimis obsito.

Proboscis dilatatus, palpis longior, apice latere altero setis crebris brevibus munito.

Caput breviusculum subrotundatum. *Oculi* mediocres, subprominuli, nudi. *Corpus* breve, attenuatum, compressum. *Alæ* anticæ oblongæ, obtusæ, margine costali dilatato-arcuato; posticæ subelongatæ, angulum analem versus sensim attenuatæ, appendiculo anali lateraliter producto, angulari, truncato; caudâ solitariâ obliquè divergente. *Pedes* antici tarsis pro sexu diversis; maris articulo solitario, elongato, cylindrico, obtuso, medio sulco obsoleto, transverso, exarato, squamis minutis obtecto, subtùs setis quoque adsperso; setis insuper nonnullis terminalibus erectis non exsertis munito; fœminæ quinque-articulatis, articulo basilari subelongato, reliquis attenuatis, squamulis minutis vestitis, subtùs parum setosis, articulo extimo unguibus duobus minutis, appendiculis utrinque lateralibus et pulvillo intermedio prædito, serie deuique terminali apicem occultante: pedes medii et postici in utroque sexu unguibus duobus minimis, appendiculis lateralibus et pulvillo intermedio muniti.

The two genera last enumerated, *Myrina* and *Loxura*, agree in various particulars; we find them accordingly united in the Encyclopédic, while the modifications of form which they exhibit, afford indications merely of sectional divisions, the type of one being *Myrina Jafra*, and of the other *Myrina Atymnus*. I originally adopted this view, as appears from the explanation of the plates of the first part; but the examinations which I instituted in the prosecution of my inquiry, and the analysis of numerous specimens of each species, have convinced me that they are, according to our present views, perfectly distinct. I therefore proceed now to the detail of the most distinguishing peculiarities of *Loxura.* The *Antennæ* are short, strict, more evidently incrassated towards the point than in *Myrina*, and provided at the terminal joints with more distinct bristles. The *Palpi* are proportionally much longer, being full half the length of the antennæ; the second and third joints differ both in form and direction, as appears from the peculiarities which are minutely exhibited in the description and plate. The *head* is comparatively narrow, and the eyes prominent. The *hinder wings* in *Loxura* are lengthened, and regularly attenuated to a narrow anal extremity; the anal appendage is angular, with a lateral projection and an abrupt posterior termination: these *wings* are provided with a single *tail*, which passes off in an oblique direction. In the essential structure of the tarsi of both sexes, *Loxura* agrees with *Myrina*; these organs are however more elongate in the former, especially in the male, and uniformly covered with minute scales, in which the annular disposition is obscure. But the most important character required for the illustration of these genera is still unknown; I mean that exhibited by the metamorphosis; but as *Loxura Atymnus* is found in the Hon. Company's botanic garden at Calcutta, I hope to be enabled to add this illustration at a future period.

Loxura is a very remarkable genus. It stands in our series near the confines of the Vermiform and Chilognathiform stirpes, and the indications which it affords in point of affinity, are highly instructive. Its relation to the genus, which in our catalogue immediately precedes it, appears, from the statements above made, and from the illustrations given in our second plate; and although the antennæ and palpi vary in proportional length, they are very similar in form.

I shall now direct the reader to those characters in *Loxura* which indicate the approach of the Chilognathiform stirpes. The external habit resembles *Colias;* the colour is spread over the surface in the same manner, and varies but little in the different sexes; the margins are similar, and the metallic irrorations existing in *Myrina* are no longer observed; the markings underneath likewise are simple. The anterior tarsi of the males, although essentially agreeing with *Myrina* in character, are more lengthened. The form

form of the hinder wings and the direction of the tail indicates an affinity to *Gonepteryx;* but this resemblance being founded entirely on an artificial character deserves not much notice.

There is, however, a considerable hiatus in the series which I am not enabled at present to supply; and it remains for future inquiry to determine whether the subjects already accumulated in other collections will fill up the deficiency existing in ours, or whether the completion of the series depends on future discoveries.

This genus is illustrated in the second plate; fig. 6; 6, a; 6, b; 6, c; 6, d; 6, e.

49. Loxura Atymnus. *Alæ suprà fulvæ, colore saturatiore lætè aurantio, vel dilutiore in flavescentem vergente; anticæ limbis exteriore et apicali saturatè fuscis, coloribus limite intermedio arcuato conjunctis, apice dilatiore; posticæ limbo apicali pallidiore intùs dilutiore evanescente, vel paginâ totâ dilutiore flavescente, margine interiore productiore canescente villoso, appendiculo anali albo-pulverulento: subtùs ochraceo-flavicantes, colore opaco pulverulento æqualiter diffuso, strigis quatuor fuscescentibus parallelis, duabus interioribus obsoletissimis, tertiâ communi ex lunulis contiguis conflatâ, quartâ intra-marginali obsoletissimâ sæpius inconspicuâ; appendiculo anali punctis tribus lunaribus confluentibus fuscis albo-pulverulentis imo diffusiore.* (Exp. alar. 1 unc. 2—6 lin.)

Plate II., fig. 6; 6, a.

Papilio P. R. Atymnus. Fab. Mant. Ins. tom. 2. p. 70. No. 662.
Myrina Atymnus. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 594.
Papilio Atymnus. Cram. pl. 331. D. E. Donov. Ind. Ins. (with a figure.)
Hospitatur in Musæo Domini Banks.

Wings above in *both sexes* fulvous, the intensity of the tint varying in different individuals, from florid but not glossy orange to pale saffron yellow; *anterior* with the exterior and posterior borders blackish-brown, the intermediate boundary being regular and passing in an arch from the middle of the costa to the inner apical angle, leaving the greatest breadth at the tip: *posterior* with a narrower and paler apical border, whose inner edge is slightly dentate and gradually diffused in the ground colour of the surface, or entirely covered with a diluted yellowish tint; inner margin dirty grayish and downy, lengthened in the direction of the anal appendage, which is irrorated with dusky white: *underneath* covered with a yellow ochraceous pulverulent tint which is uniformly diffused over the whole surface; marked with four brownish parallel strigæ, the two interior ones being very obsolete and apparent only in fresh and well-conditioned specimens, the third extending over the middle of both pairs is the most distinct and composed of darkish lunules in close succession, the fourth just within the margin is faint and interrupted; the transverse anal extremity is marked with a brownish streak consisting of three confluent spots, which are covered along the margin with whitish irrorations, the inner spot being diffused over the rounded extremity of the anal appendage. The *body* is brownish above with a slight admixture of yellow; the thorax bears delicate silky hairs; underneath these parts are covered with a short close whitish down. The *antennæ* are brown: *tails* pale fulvous with an obscure brownish margin and a whitish tip.

This species is described by Fabricius, who indicates Siam as the native country, and the specimen from which his description was probably made is still preserved in the Banksian Cabinet. Cramer has given a figure in which the most distinguishing organs, the palpi, are wanting. Donovan's figure does not give a

correct

correct idea of the form. It was therefore desirable to represent both surfaces with more accuracy, an object I trust our figure has sufficiently attained. This insect is by no means unfrequent in Java. Our collection contains at least eighteen specimens. The female, according to my observation, can be distinguished only by the structure of the anterior tarsi; in colour and painting it differs not perceptibly from the male.

50. Loxura Pita. *Alæ suprà* fœminæ *fulvæ, colore saturato in aurantium vergente, anticæ limbis exteriore et apicali intùs arcuatim circumscriptis, posticæ limbo apicali fasciâque obliquâ ab angulo apicali anteriore ad medium marginis interioris tendente ex maculis quatuor subcontiguis efformatâ saturatè fuscis; margine interiore abdomen excipiente cano, appendiculo anali albo notato: subtùs ochraceo-flavicantes, colore pulverulento opaco æqualiter paginam totam obtegente; areâ medianâ singularum arcubus minutis obsoletissimis fuscis notatâ, in anticis sparsis in posticis seriebus duabus parallelis ordinatis, posteriore in regione anali saturatiore intùs creperâ albâ limbatâ; tæniâ denique marginali strigâ albâ intus auctâ, punctoque ocellari in appendiculo anali lunulâ albâ stipatâ fuscis.* (Exp. alar. 15 lin.)

Wings above, in the female, fulvous, the tint being saturated and inclining to orange; *anterior,* with the exterior and apical borders blackish brown, meeting the orange portion in a regularly arched boundary line, extending from the middle of the anterior costa to the inner apical angle; *posterior,* with the apical border and an oblique band composed of four contiguous spots extending from the outer apical angle to the middle of the inner margin, of the same colour; anal termination of the apical border diffuse and evanescent internally and marked with a few obsolete white dashes; inner margin excavated to receive the abdomen, gray: *underneath* ochraceous-yellow, uniformly covered with an opaque pulverulent tint; medial portion of the surface of both pairs marked with numerous very minute and obsolete brown arcs, which in the hinder pair are arranged in two parallel interrupted strigæ, the posterior one increasing in distinctness towards the inner margin, where it bears externally a lunular white cloud; extreme anal margin bearing an irregularly diffuse brown stripe terminating in a distinct ocellate spot on the anal appendage; the latter surrounded internally by a white lunule from which an obscure striga passes over the extreme anal region. *Tails* ferruginous brown, tipt with white: *body* brown above, pale yellowish underneath: *legs* whitish, marked with numerous well defined black bands, which are more crowded on the tarsi.

Loxura Pita closely agrees in a generic point of view with *L. Atymnus:* the antennæ have the same strictness and the palpi the same proportional length: the character of the tail is likewise the same. As a species *Loxura Pita* is distinguished above by a deeper orange tint, by a broader border and by a transverse macular band on the hinder pair: underneath the ocellate spot and the marks on the anal region are more pronounced and the legs are distinctly marked with black bands; the tail also is proportionally lengthened and the wings are rather more expanded in breadth.

Our Museum contains a single female specimen in perfect condition.

Genus

Genus PHÆDRA.

POLYOMMATUS. *MM. Latr. et Godt.* HESPERIA. *Fab.*
PAPILIO. *Cramer, Drury, Herbst.*

CHARACTER. *Larva.* *Chrysalis.* } hactenus latent.

Imago: Antennæ breves, cylindricæ, sensim extrorsum incrassatæ, apice rotundato, inflexo, acumine obsoleto, laterali; articulis exterioribus verticillato-ciliatis, interstitiis transversè sulcatis.

Palpi mediocres, graciles, compressi; articulo basilari brevissimo, arcuato, capiti adnato; articulo secundo oblongo, porrecto; his subtùs pilis brevibus, sericeis, æqualibus, deorsùm spectantibus arctè vestitis; articulo terminali brevi, attenuato, holosericeo.

Proboscis brevissimus, tenuis.

Caput breve, obtusum, latum. *Oculi* planiusculi, pilis brevissimis parcè conspersi. *Corpus* mediocre, attenuatum. *Alæ* anticæ oblongæ, posticæ rotundato-obtusæ, areolâ discoidali posticè apertâ. *Pedes* antici tarsis pro sexu diversis; *maris* articulo solitario, elongato, obtuso, ungue acuto abruptè inflexo terminato, sulcis quatuor transversis, obsoletis exarato, pilis holosericeis obsito; *fœminæ* quinque-articulatis; articulo basilari elongato-ovato, tribus intermediis minimis orbiculatis, decrescentibus, ultimo ovali, unguibus duobus parvis, lateralibus, pulvilloque intermedio munito: pedes medii et postici, in utroque sexu, tarsis quinque-articulatis, singulis unguibus duobus lateralibus, appendiculis et pulvillo intermedio instructis.

CHARACTER. The *larva* and *chrysalis* as yet unknown. In the perfect insect: *Antennæ* short, cylindrical, gradually thickening to the extremity, which is rounded, obtuse, with an obscure laterally inflected, mamillary point; exterior articulations surrounded by minute bristles, while the interstices are transversely sulcated or delicately wrinkled. *Palpi* of moderate length, slender, compressed; basal joint short, applied to the head; second joint oblong, obliquely porrected; both these are densely clothed with silky hairs of equal length; third joint short, attenuated, tending forward, covered with a delicate silky down. *Proboscis* short and slender. *Head* short, obtuse, broad. *Eyes* plane, very sparingly clothed with a short, scattered, down. *Body* of moderate length, attenuated. *Wings: anterior* oblong; *posterior* rounded, obtuse; discoidal cell not closed. *Feet:* anterior with tarsi differently constructed in the sexes; in the *male* consisting of a single elongate, obtuse joint, terminated by an acute abruptly inflected claw, marked with four very obsolete transverse grooves, which are concealed by the silky down investing the tarsus; in the *female* with tarsi consisting of five joints; the first oblong-ovate, the three following very short, orbicular and decreasing in dimensions; the fifth oval and provided with two small lateral claws and an intermediate pulvillus: the tarsi of the middle and posterior feet have all five joints, the terminal one being armed with two lateral claws, intermediate appendages, and a pulvillus.

After the remarks which were made on the genus *Loxura* and on the indications afforded by it of the evident approach of the Chilognathiform stirps, the introduction of another genus of the Vermiform stirps, which does not contribute to supply those deficiencies indicated in the series, requires some explanation. The individuals of the genus now defined with the name of PHÆDRA, possess in their perfect state a complication of characters, partaking of several genera, besides certain peculiarities of their own. In the structure of the antennæ they agree upon the whole with *Loxura;* and the palpi although shorter than in

that

that genus, are constructed on the same plan; whereas in the anterior feet of the male they resemble the individuals of the first great subdivision of the genus *Thecla*, the *Th. strictè sic dictæ*. In the covering of the underside of the wings, in their markings and in the abrupt termination of the hinder pair, they differ from all the individuals of the genera *Lycæna* and *Thecla*. But our knowledge of the genus *Phædra* is still imperfect and until its character shall be fully illustrated by the discovery of its metamorphosis, which I hope to obtain from our Indian researches, its present disposition at the extremity of the Vermiform stirps, is only provisional. In the Encyclopédie the continental species of *Phædra* is arranged in the fourth great subdivision of the genus *Polyommatus*, comprising subjects with entire or slightly dentate wings; several of the species of the same section resemble our insect in the colour of the upper surface, although they have nothing of the peculiarity which distinguishes the under side; and they are all essentially different in a generic point of view.

A very detailed dissection of our genus, in which the peculiarities of the perfect insect are distinctly brought into view, has been prepared: this I hope to be enabled to introduce in one of the succeeding plates of the *Lepidoptera diurna*.

51. PHÆDRA TERRICOLA. *Alæ posticæ obtusæ;* maris *suprà ex aurantio fulvæ, limbis exteriore et posteriore apice largo anticarum fasciâque tenuissimâ marginali posticarum nigricanti-fuscis;* fœminæ *fuscæ, singulæ plagâ maximâ discoidali albâ: subtùs sericeo-albæ, paginâ totâ singularum colore opaco nitente squamuloso densè opertâ, serie punctorum intramarginali strigâque post-medianâ obsoletissimis nigris.* (Exp. alar. 1 unc. 5—7 lin.)

Hesperia R. Phædrus. Fab. Ent. Syst. Em. tom. 3. pars. 1. p. 307. No. 165. (The male.)

Hesperia. R. Æsopus. Fab. Ent. Syst. Em. loc. cit. No. 164. (The female.)

Papilio Cinyra. Cram. pl. 238. fig. C. (The male.)

Papilio Thetis. Cram. pl. 238. D. (The female.)

Polyommatus Phædrus. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 675.

Hospitatur in Musæo Domini Banks.

Hinder wings broad and obtuse with an abrupt regularly transverse posterior margin, gradually rounded towards the outer apical angle: *upper surface*, in the *male*, fulvous with a deep orange shade, having the exterior and posterior borders of the fore wings defined by a hemispherical boundary which leaves a broad apex, and a narrow posterior marginal line of the *hinder wings*, blackish brown; in the *female* brown, the wings being individually marked with a large oblong white spot occupying the disk and adjoining portions of the surface: *underneath* both pair are densely covered throughout with a milky-white glistening stratum of colouring particles, delicately pulverulent or scaly in appearance, exhibiting when rubbed irregular patches of a brownish ground; in some specimens this stratum is uniform and immaculate; others are very obsoletely marked with a series of minute dots, just within the posterior margins, and with a very faint common striga behind the disk, accompanied in some individuals by a parallel line towards the middle of the wing, of a black colour. *Body* above brown, with lengthened fulvous hairs in the male and brownish hairs in the female; underneath silky white: *legs* of the same colour, with very obscure orange bands towards the tarsal extremity. *Antennæ* brown with an orange tip.

This species appears to have an extensive range on the Continent: we have, from various parts of India, five male and two female specimens. It was not observed in Java. The Banksian Cabinet contains one male

male with the mark of *Papilio R. Phædrus*, and two females with that of *P. R. Æsopus*, in Fabricius' own hand-writing. The decision of the authors of the Encyclopédie, above referred to, according to which the *P. R. Æsopus* of Fabricius is not a distinct species but the female of *Phædrus*, is confirmed by a careful dissection which is intended for a future plate.

52. Phædra Insularis. *Alæ posticæ regionem analem versus subattenuatæ in angulum rotundatum productæ*, maris *suprà cupreo-fulvæ, limbis exteriore et posteriore, apice largo anticarum fasciâque latâ marginali intùs evanescente posticarum nigris ; canali abdomen recipiente pallidiore villis fuliginosis vestito : subtùs sericeo-argenteæ glaucino lavatæ stratu pulverulento paginam totam operiente, strigis duabus posticis tenuissimis undulatis completis, interiore saturatiore, serie intramarginali punctorum minutorum punctoque solitario in medio marginis interioris nigris ; singulæ insuper striolâ carinatâ discoidali obsoletissimâ.* (Exp. alar. 18 lin.)

Hinder wings gradually attenuated towards the anal region, with a slightly rounded inner apical angle; *upper surface* (in the male) with a bright cupreous lustre inclining as the light varies to reddish-brown; exterior and posterior borders of the fore wings and posterior border of the hinder wings black, in the former the intermediate boundary forms a bold curve leaving a broad apex, in the latter the inner edge is slightly waving and evanescent; the concave inner margin which receives the abdomen is paler and covered with delicate hair of a sooty tint: *underneath* satin-white, the colour being spread in an opaque pulverulent stratum uniformly over the whole surface and covered with a silvery slightly glaucous gloss; behind the disk two very delicate waving strigæ of a blackish tint pass regularly over both pairs, the anterior being more pronounced; just within the hinder margin is a series of very minute black dots and near the middle of the inner margin stands a solitary dot of the same colour; on the disk the indication of a transverse brownish litura is faintly observed, which however is more lengthened and distinct in the hinder pair. All the wings have along their posterior margin a grayish line. *Body* and *abdomen* above glaucous inclining to brown with a lengthened down of the same colour; underneath yellowish white and pulverulent; *legs* of the same colour with obscure brown spots. *Antennæ* brown.

Two males in excellent condition have furnished the materials for the preceding description; the female was not observed, and the history of this species remains therefore imperfect. The form of the hinder wings indicates a sectional division in this small group.

CHILOGNATHIFORM

OR

IULIFORM STIRPS.

Character.

Larva elongata; nunc cylindrica; nunc utrinque æqualiter angustata vel medium versus incrassata, convexa, dorso arcuata, anticè conico-attenuata: superficie modò glabra, omnino lævis, vel anticè clypeo maximo e summo dorso ad caput usque operta; modò arctè punctulata vel pilosa vel hirsuta vel appendiculis carnosis munita: caput globosum retractile corpori mediante articulo brevi junctum, exsertum subsolutum: furcula retractilis inter caput collumque media, perfectioris structuræ indicium, in generibus stirpi vermiformi accedentibus haud obvia. (Larva, quoad habitum Iulo *similis.)*

Pupa nuda angulata, quoad formam valde variabilis, tuberculis seriatis numero ac magnitudine diversis ornata; anticè modò acumine simplici terminata, modò bifida; posticè attenuata, fulcro adnexa; mediantibus filis collum abdomenque ligantibus verticaliter vel obliquè suspensa, capite sursum spectante.

Observation.—The larva of this stirps is in all the various forms in which it appears, of great proportional length. Near the confines of the Vermiform stirps it is slightly attenuated at both ends, marked with distinct transverse striæ at the segments and covered with minute elevated dots. This character it possesses in *Colias* (see Pl. iv. No. 6 and 7) and in *Gonepteryx* as figured by Roesel (vol. iv. Tab. xxvi. 1. 2. 3.). In the division which follows in natural order, the larva is regularly cylindrical, slender and closely covered with down or hairs: it exhibits this form in *Terias* (see Pl. iv. No. 8), *Pontia* (Pl. iv. No. 9) and the allied genus *Leucophasia*. We have next, in the Javanese series, a larva, slightly attenuated at both ends and gradually approaching the character of the following group; it is figured on our Pl. iv. No. 10, and the species agreeing with it, constitute the genus *Pieris* as applied in this catalogue. The group which succeeds to it and which appears to be peculiar to northern regions, has an intermediate character, while it is at the same time, quite anomalous in its pupa state. The principal genus in this group is *Doritis*: the

the form and covering of the larva resemble those of *Pieris;* but now we have the first indication of the osmaterium or of that retractile, bifid organ which characterises the typical group of this stirps. *Doritis*, *Thais*, and the allied genera require however further examination; and this statement also requires the comparative illustration afforded by the perfect insect.

In following the series we have now arrived at the genus *Papilio* constituting a very extensive group, the individuals of which have not as yet been arranged accordingly to their true affinities. The metamorphosis in the Javanese and Indian series, in our collection, exhibits the following forms. *First:* a perfectly smooth larva, with nearly uniform surface, considerably distended about the fourth or fifth segment of the body, with an elevated arched back from which it tapers rather abruptly to the head and more gradually towards the anal extremity. Two examples of this form are contained in the Javanese series: see Pl. iii. fig. 5 Pl. iv. fig. 12. *Secondly:* a larva agreeing with the former in outline of form, but being thicker, of a sluggish habit and marked anteriorly with a large clypeus or shield, extending from the arched dorsal elevation to the head. It appears to be peculiar to tropical climates and is found on both Continents; in the East-Indies it appears to be comparatively abundant and four different modifications are represented from Java. The work of Smith and Abbot exhibits several American forms of it. *Thirdly:* an elongated, cylindrical, comparatively thick larva, very slightly attenuated at the extremities, with a smooth surface, from which naked fleshy tubercles arise, varying in thickness and length in different species. Of this we have two examples from Java, exhibited in the 17th fig. of the iii. and in the 13th of the iv. plate. Besides these I am enabled to give a third Indian example of the third group, which was liberally communicated to me by General Hardwicke; it is represented in the 1st fig. of the viii. plate. The indication which this larva affords of the gradual passage towards the *Chilopodiform* stirps has already been indicated on the 41st page of the introduction; and the details of the gradual variation of form as they show the proximity of the next stirps, will be given in the sequel. The most striking peculiarities of the pupa and of the perfect insect have been detailed in the introduction, p. 42, 43, 44; and on the Synoptic table; the more minute modifications of form are given in the generic characters. The subdivision of this stirps into families is reserved for another occasion.

Genus COLIAS.

Colias. *Fab. Latr. Ochsenh. Curtis, Stephens, &c.* Papilionis—Danaorum candidorum species. *Linn.* Papiliones: Danai flavi. Fam. E. Larvæ pallidiventres. *Wiener Verzeichnis*, 164. Clouded yellows. *Haworth.*

Character. *Larva* cylindrica, gracilis, utrinque attenuata, obsoletè transversim scutata, punctis elevatis, minutis tenuiter annulata, rarius subtomentosa, lateribus strigâ lætiore ornatis: capite parvo rotundato. (Tab. iii. fig. 14. Tab. iv. fig. 6. 7.)

Chrysalis glabra, subcompressa, obtusè angulata, suprà carinata, medio subarcuata, anticè mucrone solitario definita; abdomine attenuato arctè adnexo, filo mediano laxo rectè aut horizontaliter suspensa. (Tab. iv. fig. 6, a; 7, a.)

Imago: Antennæ mediocres, validæ, abruptè truncatæ: in sectione prima de basi ad apicem sensim incrassatæ; in altera ultra medium filiformem in capitulum elongato-obconicum productæ.

Palpi compressi, brevissimi, capiti adnati, penicillo clypei omnino reconditi, rariùs apice libero porrecti; articulo basilari elongato, arcuato, nunc subtùs squamis linearibus teneris, radiatim patentibus vestito, nunc setis longis diffusis hirsuto; articulo secundo oblongo, pilis æqualibus

æqualibus sericeis vestito, vel setis laxis reflexis consperso; articulo ultimo ovato vel subcylindrico, obtuso, sericeo vel nudo, omnino recondito; nunc breviter exserto.

Proboscis longus, validus, spiralis.

Caput breve, villis crebris obsitum, penicillo intermedio porrectiore. *Oculi* mediocres nudi, vix puberuli. *Thorax* dilatatus. (*Abdomen* maris, articulo ultimo acuto, subtùs unco tenui incurvato; valvis magnis, attenuatis, aduncis. *Swainson's Zool. Illust. I.*) *Alæ* largæ; anticæ oblongæ vel elongato-trigonæ; posticæ rotundatæ, sulco abdomen recipiendo concolore: areolâ discoidali singularum clausâ. *Pedes* graciles, elongati; antici in utroque sexu conformes; tarsi singulorum articulis quinque, basilari elongato, reliquis subæqualibus, ultimo unguibus duobus, lateralibus, bifidis, brevibus, arcuatis, acutis, pulvilloque intermedio munito.

The genus *Colias*, as at present limited in our systems, comprises two sections, which differ both in the perfect insect and the metamorphosis. In the former the antennæ are gradually and uniformly thickened towards the tip; the palpi are covered with short delicate bristles or scales of uniform length and disposition, and the third joint is somewhat lengthened and attenuated; in the latter the antennæ are filiform at the base and swelled at the extremities into a perceptible club of a lengthened-ovate or obconic form, occupying about one-third of the organ; the covering of the palpi is less regular; lengthened, straggling hairs are mixed with the villi and scales, and the third joint is small, round, and obtuse. The first is perhaps exclusively a tropical form. The metamorphosis is exhibited in the sixth figure of our fourth plate, and *Colias Scylla* of the following catalogue may be adduced as typical of the perfect insect. The antennæ and palpi are beautifully illustrated in the fifth plate of Mr. Swainson's Zoological Illustrations. The latter appears to belong to northern climates, and I refer to the 242d plate of Mr. Curtis's British Entomology, for the peculiarities of this subdivision as far as regards the antennæ and palpi.

In offering these remarks I have much pleasure in repeating the acknowledgment of the assistance received from Mr. Swainson, more particularly in the arrangement of this genus; and I trust I shall have his sanction in applying to the second great division of the genus *Colias*, as a subgeneric distinction, the name of Eurymus, by which he designated this form about eight years ago in my private collection, and which I have preserved in manuscript. The propriety of this separation appears further from the peculiarities of the larva of *Colias Hyale;* and we are greatly indebted to Mr. Curtis for the copy of it exhibited in his 242d plate from Hübner. Whoever will compare this with the larva of true *Colias*, as exhibited in our fourth plate, will notice the gradual approach to the form of *Pontia*, which is confirmed by the perfect insect.

* *Larva utrinquè attenuata, punctis elevatis minutis tenuiter annulata: antennæ e basi ad apicem sensim incrassatæ: palpi villis squamisque brevibus, teneris, æqualibus obtecti, articulo ultimo ovato attenuato, nonnunquam subelongato.*

Colias strictè sic dicta.

53. Colias Pyranthe. *Alæ albæ, suprà* maris *limbis exteriore et posteriore anticarum,* fœminæ *limbo posteriore communi nigris; anticæ insuper notâ discoidali nigrâ, in mare lineari transversâ minutâ in fœmina orbiculari insigni: subtùs cinereo-undulatæ, puncto discoidali singularum argenteo iride lilacinâ cincto.* (Exp. alar. 2 unc. 3 lin.—3 unc.)

Wings white above; in the male, fore-wings with exterior and posterior borders, in the female, both pairs with a common posterior border black; anterior wings with a discoidal mark, which is linear, transverse and minute in the male, large and oval in the female: underneath with numerous, close, transverse, cinereous undulations, and on each wing a minute, argentine discoidal spot, surrounded by an irregular iris of a lilach tint.

 Papilio

Papilio D. C. Pyranthe. Linn. Syst. Nat. tom. 2. p. 763. No. 98.

Papilio D. C. Pyranthe. Fab. Spec. Ins. tom. 2. p. 44. No. 188. *P. D. C. Nephte.* Fab. Ent. Syst. Em. tom. 3. pars 1. p. 190. No. 588. *Papilio D. C. Gnoma.* Fab. Spec. Ins. tom. 2. p. 50. No. 217. (Mas.) Hospitatur in Mus. Dom. Banks.

Papilio Alcyone. Cram. Pl. 58. fig. A. B. C.

Colias Pyranthe. MM. Latr. et. Godt. Enc. Méth. Hist. Nat. ix. 97.

Candor *alarum* suprà in cœrulescentem subtùs in virescentem vergens: *anticæ* subtùs dimidio interiore immaculato; singulæ strigâ distinctiore undulatâ inter discum marginemque posteriorem mediâ. Puncta ocellaria paginæ inferioris pallidè argentea iride lilacinâ cincta; nonnunquam vero, in mare, omnino desunt, vel rarius, præsertim in fœmina sesquialtera. *Saccus glandularis* oblongus, subbasalis, opacus, pulverulentus, saturatè sulphureo tinctus, discrimen sexuale maris suppeditat; neuro exteriori areæ discoidalis adhærens, penicillo plano ex villis sericeis elongatis efformato, e margine interiore alarum anticarum exserto occultatur: fœmina discrepat limbo exteriore anticarum nigro, insigniore, apiceque dilatiore. *Corpus* suprà villis sericeis longis albis ornatur: *antennæ* pallidè lilacinæ cinerascente pulverulentæ.

This species, which was originally described by Linnæus with the name of *P. Pyranthe,* has from its accidental and sexual varieties received different denominations. Those occurring in the works of Fabricius are judiciously analysed and disposed by the authors of the Encyclopédie. Cramer's figure represents that variety of the male in which the under-side is without ocellate spots: our collection contains several individuals of the same description. Two of our specimens, a male and female, are from Java, and more than twelve of both sexes from various parts of continental India. The specimen of *Gnoma* preserved in the Banksian cabinet, bears Fabricius' original mark. Donovan, in his Chinese insects, has figured the female.

54. Colias Phillippina. *Alæ suprà albæ, marginem versus flavido lavatæ; anticæ limbis exteriore et posteriore punctoque medio nigris: subtùs dilutè flavicantes cinereo-undulatæ, serie maculari distinctiore disco marginique postico intermediâ; anticæ puncto ocellari solitario, posticæ punctis tribus discoidalibus argenteis, singulis annulo lilacino cinctis.* (Exp. alar. 2½ unc.)

Wings above white, with a yellowish tint exteriorly increasing in strength towards the margin; in the fore-wings the exterior and posterior borders and a round dot on the disk, are of an intense black colour: underneath pale yellowish, with numerous transverse cinereous undulations, among which a more distinct macular series passes between the disk and margin through both pairs; fore wings with a single, hinder wings with three argentine discoidal spots, which are individually surrounded with a circle of a lilacine tint.

Papilio Philippina. Cram. pl. 361. fig. C. D.

Colias Philippina. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 96.

This species greatly resembles *Colias Pyranthe;* it is however clearly distinguished by the ocellate spots of the hinder wings underneath: the macular band of the lower surface is likewise more pronounced than in that species, and the spots have a decided wedge-shaped form. The diffuse yellow border of the fore-wings above is likewise, as far as appears from our materials, peculiar to this species. Our insect is also closely allied to *Colias Florella* of Fabricius, found at Sierra Leone, of which a specimen is preserved in the Banksian cabinet.

Colias Philippina was not found in Java: we have several Continental and Ceylonese specimens; they supply nothing to the history of this species.

55. Colias Glaucippe. *Alæ albæ, suprà anticæ dimidio apicali vividè fulvo, limbis exteriore et posteriore*

posteriore limite mediano flexuoso discum obliquè transeunte, serie intramarginali macularum cuneatarum venisque apicalibus nigris, posticæ maris *immaculatæ albidæ,* fœminæ *sordidè flavicantes, limbo posteriore intùs argutè dentato serieque interiore punctorum nigris: subtùs albæ, flavido lavatæ; anticæ dimidio apicali, posticæ paginâ totâ fusco cinereoque nebulosæ, notis saturatioribus infuscatæ.* (Exp. alar. unc. $2\frac{3}{4}$—4.)

Wings white; upper surface in the fore-wings with the apical half vivid fulvous, the exterior and posterior borders, an oblique medial boundary passing flexuose across the disk, a series of wedge-shaped marks parallel with the margin, and the exterior veins black; hinder wings, in the *male* whitish immaculate, in the *female* dirty yellowish, the posterior border with acutely dentated inner edge and a parallel series of minute dots of a black colour: underneath whitish slightly tinged with yellow; fore-wings with the apical dimidial portion, hinder wings with the whole surface delicately dotted and undulated with brownish-gray, small clouds and patches, sprinkled with more saturated dots and marks, being irregularly scattered over the surface.

Plate IV, fig. 7; 7, a. The larva and chrysalis.

Papilio D. C. Glaucippe. Linn. Syst. Nat. 2. p. 762. No. 89. Fab. Spec. Ins. tom. 2. p. 45. No. 191. Hospitatur in Musæo Domini Banks.

Papilio Glaucippe. Cram. pl. 164. fig. A. B. (The male) fig. C. (The female).

Pieris Glaucippe. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 119.

It appears from the preceding list of Synonyms, that our species is arranged, in the Encyclopédie, in the genus *Pieris.* I found my present determination not only on the metamorphosis, which closely resembles that of *Colias,* (as appears from the 6th and 7th figures of my fourth plate) but also on the character of the perfect insect: the antennæ agree in all points with those of that genus; the palpi are very similar; a slight peculiarity which they present can only be exhibited satisfactorily by a dissection.

Colias Glaucippe is not unfrequent in Java, and various specimens were obtained by breeding. The larva feeds on a species of *Capparis,* distinguished by the native name of *Wanwannan.* Our museum contains numerous specimens of both sexes from Java and from the continent of India. It has an extensive range through intratropical India, and is found in most collections. Linnæus gave an early account of it.

56. Colias Alcmeone. *Alæ suprà albæ,* maris *ad basin fasciâ latâ sulphureo-flavâ discum versus irregulariter laciniatâ, anticæ limbo exteriore apiceque tenuissimo,*—fœminæ *limbis posticis singularum, exterioribus anticarum, puncto insuper discoidali orbiculari nigris: subtùs singulæ flavicantes immaculatæ.* (Exp. alar. unc. $2\frac{1}{4}$—$2\frac{3}{4}$.)

Wings above, in the *male,* white, with a broad common snlphureous-yellow basal fascia, irregularly laciniated along the edge which looks towards the disk; anterior wings very narrowly edged with black at the apex and adjoining portions of the margins; in the *female,* posterior borders of both pairs, as well as the exterior costal border and a circular dot on the fore-wings, black: underneath all the wings, in both sexes, yellowish and immaculate.

Papilio D. C. Alcmeone. Fab. Spec. Ins. tom. 2. p. 44. No. 186. Hospitatur Mus. D. Banks.

Colias Alcmeone. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 97.

Alæ suprà albæ, fasciâ flavâ basali, in mare discum versus margine irregulariter sinuato abruptè definitâ; fœminæ limbo communi postico dilatiore, intùs evanescente vel obsoletè sinuato nigro, apice nigricante alboque variegato; costâ margine angusto nigro-limbatâ, intra medium dilatiore, processu

processu attenuato discum versus tendente aucto. *Saccus glandularis* pulverulentus, in mare nervo antico areæ discoidalis adhærens, penicillo plano ex villis elongatis sericeis patentibus conflato, egregiè opertus. Subtùs flavedine ad basin saturatiore; alæ anticæ in area anali pallescentes. *Corpus* flavidè virescens, villis longis laxis concoloribus vestitum: *antennæ* fuscæ apicem versus ferrugineo tinctæ.

This species is very abundant in Java, and we have numerous specimens of both sexes. It is also contained in our continental collections. Fabricius gives a distinct description of it in all his systematic works; it has not as yet been figured.

57. Colias Jugurthina. *Alæ suprà albæ, ad basin fasciâ latâ discum versus evanescente flavâ, limbo communi postico punctoque discoidali anticarum nigris; apice nigricante alboque variegato, costâ limbo nigro basin versus in dentem dilatato: subtùs stramineæ nitentes ad basin saturatiores dimidio interiore anticarum albicante; strigâ maculari communi posticâ fuscescente, singulæ insuper puncto solitario discoideo obsoleto flavicante in anticis sæpius deficiente.* (Exp. alar. unc. $2\frac{1}{4}$—$2\frac{3}{4}$).

Wings above white, with a broad yellow fascia at the base, gradually paler towards the disk; posterior margins of both pairs and a discoidal spot of the fore-wings black, while the apex is paler and variegated with irregular spots of the ground colour; costal border also black, and spreading towards the base to a dentiform process, which sometimes touches the discoidal spot; underneath straw-coloured yellow and shining, the base being more saturated, while the interior portion of the fore-wings is nearly white; a macular series of obsolete brown spots passes behind the disk through both pairs, while each wing has in the middle of the disk a single obscure yellowish dot, which is sometimes wanting in the fore wings.

Papilio Jugurtha. Cram. pl. 187. fig. E. F.
Papilio Statira. Cram. pl. 120. C. D.
Papilio Crocale. Cram. pl. 55. C. D.
Colias Jugurthina. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 96.

I have found it difficult in the comparison of a very extensive number of specimens, to discriminate this species from its neighbours in the series, and I admit it with some uncertainty regarding its real distinctness. The specimens in our collection agreeing with the character above given are all females, and it remains to be determined whether they are not mere varieties of the 56th or 58th species. In several male specimens, which resemble those of *C. Alcmeone* in all other points, a very faint discoidal spot is however observable. I have followed the authors of the Encyclopédie in the appropriation of the synonyms. We have specimens agreeing with the individual figures of Cramer above cited: but those of *P. Crocale* and *P. Statira,* are most strongly marked. The dot of the under-surface of the hinder wings is in many cases sesquialterous; and this confirms the affinity to the next species.

58. Colias Hilaria. *Alæ suprà* maris *albæ, fasciâ latâ sulphureâ discum versus irregulariter laciniatâ, marginibus ad apicem tenuissimè nigro-limbatis;* fœminæ *paginâ totâ, nonnunquam dimidio basilari tantum, lætè flavæ, anticæ limbis exteriore et postico, puncto discoidali serieque obsoletâ intramarginali macularum cuneatarum, ex apice discum versus obliquè divergente nigris; posticæ limbo posteriore continuo vel interrupto maculari nigro: subtùs in utroque sexu flavæ vel ex pallidè stramineo micantes; anticæ puncto discoidali solitario flavido vel ochracco, posticæ puncto sesquialtero vividè argenteo micante insigniore, singulis circulo simplici aut duplici circumscriptis vel in macula diffusa lilacina vel ferruginea nidulantibus.* (Exp. alar. unc. $2\frac{1}{4}$—$2\frac{5}{8}$).

Wings

Wings above in the male, white, with a broad common sulphureous-yellow basal fascia irregularly laciniated along the edge which looks towards the disk, the extreme borders being very delicately edged with black at the tip; in the female, the entire surface or in some cases the basal portion alone bright yellow; the fore-wings (in this sex) having the exterior and posterior borders, a discoidal spot and an obsolete series of wedge-shaped marks passing obliquely from the apex towards the disk black, while the hinder wings are confined by a continued or interrupted border of the same colour: underneath in both sexes yellow, or covered with a pale stramineous yellow shining tint; fore-wings with a single pale yellowish or ochraceous discoidal spot; hinder pair with a sesquialterous spot, larger in size and of a bright silvery tint; these spots being individually surrounded by a single or double ring, or entirely bedded in a broad spot of a lilach or ferruginous tint.

Papilio Hilaria. Cram. pl. 339. fig. A. B. (The male.)
Colias Hilaria. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 97. (The male.)
Papilio Catilla. Cram. pl. 229. fig. D. E. (Variety of the female.)
Papilio D. C. Catilla. Fab. Ent. Syst. tom. 3. pars. 1. p. 209. No. 656. (The female.)
Colias Catilla. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 95.

Mas suprà cum specie antecedente omnino convenit: fœmina tincturâ gaudet lætiore paginam totam operiente vel quandoque variat limbo postico saturatiore vel etiam flavedine ultra medium evanescente. Subtùs alæ maris ex albicante flavescunt vel nitore stramineo-argentino sunt lavatæ; fœminæ vero lætissimè flavæ pulverulentæ, versus marginem posteriorem serie macularum cuneatarum fuscarum signantur, maculis violaceis insuper sparsis; notæ discoidales in utroque sexu numero ac dispositione æquales in mare circulo tenuiore lilacino cinguntur, in fœmina ambitu duplici tenui vel diffuso indeterminato complexæ, in posticis interdum in plaga maxima profundè sinuata e disco ad costam obliquè extensa ferruginea nidulant. Hæc varietas a Cramero, loco suprà citato delineata, in musæo nostro hospitatur egregiè asservata. Saccus glandularis maris penicillo sericeo opertus sicut in congeneribus adest. *Pectus* virescens: *abdomen* flavidum, pilis longis laxis sericeis canescentibus vestitum: *antennæ* e saturato violaceo in fuscescentem variantes.

The proposed union of two species, the *Colias Hilaria* and *C. Catilla* of Cramer, which are kept distinct by the authors of the Encyclopédie, is founded on the examination of a very numerous series of specimens. In all these the male exhibits an uniform character, and is clearly distinguished by the glandular sac above described, and its covering, which consists of a beautiful silky brush protruded from the inner edge of the anterior wing near the base.

I have endeavoured to indicate clearly the characters by which the preceding species are distinguished; in the upper surface they all greatly resemble each other, and, as in all species of this genus, we must be directed in the discrimination of them by the markings of the under-side. This species is extremely abundant: we have at least forty specimens exhibiting all its varieties. The under-side of the female in many cases, assumes a light, stramineous, shining tint, resembling that of the male.

59. Colias Scylla. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 95.

Plate IV, fig. 6, Larva; fig. 6, a. Chrysalis.

Papilio D. C. Scylla. Linn. Syst. Nat. 2. p. 763. No. 95. Fab. Spec. Ins. tom. 2. p. 47. No. 203. (The female). *Papilio D. C. Cornelia.* Fab. Mant. Ins. tom. 2. p. 21. No. 229. (The male.)

Papilio

Papilio Scylla. Cram. pl. 12. fig. C. D. Sulz. Ins. edit. Rœm. tab. 15. fig. 6. (The male.)
Papilio Scylla. Donov. Ind. Ins. (with a figure.) Hospitatur in Mus. D. Banks.

This species is very uniform in its markings: the sexes are very clearly distinguished on the upper surface; they agree underneath, with this modification, that the marks of the female have a more saturated tint and are more diffuse. *Colias Scylla* presents no prominent varieties: the description given of it in the Encyclopédie is quite satisfactory, and requires no explanatory details. The male is provided, as in the allied species, with a glandular sac near the base of the hinder wings, and with a corresponding brush-like covering protruded from the inner margin of the fore-wings. The metamorphosis is represented on our fourth plate, fig. 6; and 6, a. The larva feeds on various species of *Cassia*, particularly on the *Cassia fistula* and *C. obtusifolia*, and in this habit, it agrees with the *C. Pyranthe*, according to Dr. Kœnig and with the *P. Sennæ* of Linnæus figured by Abbot. It is, however, occasionally found on other plants: it is extremely abundant, particularly in the early part of the rainy season, after the renewal of the foliage of these plants. I must, however, remark, that the various species of *Colias* contained in this catalogue resemble each other so closely in the larva state, that the distinction of species is extremely difficult. The greatest number of specimens obtained by breeding belong to the species now described; but in examining the series put up in Java in illustration of the drawings prepared during the progress of this research, I now observe several specimens of *Colias Jugurthina* and *Colias Alcmeone*, a circumstance which shows their near resemblance in the larva state. Among these specimens is contained that remarkable variety of *Colias Jugurthina*, figured by Cramer with the name of *Papilio Crocale.*

** *Larva lineari-cylindrica, subtomentosa: antennæ basi ultraque medium filiformes, capitulo elongato-ovato vel obconico: palpi setis villisque longis diffusis hirsuti, articulo ultimo obovato, obtuso.*

Subgenus Eurymus. Swainson.

Observation.—This form appears to be confined exclusively to extratropical regions; no individuals belonging to it are contained in our collection. Mr. Swainson gives *Colias Hyale* as the type of this subgenus, and I refer again to Mr. Curtis's distinct illustration contained in his lxi. No. pl. 242: the larva evidently leads to the next modification of form.

Genus TERIAS.

Terias. *Swainson.* Zool. Illust. iv. pl. 22. Papilio. *Linn. Fab.* &c. Pieris. *Latr.*

Character. *Larva* lineari-cylindrica, gracilis, utrinquè obtusa, obsoletè transversim scutata, villis brevibus hirta, strigâ pallidâ laterali signata: capite parvo, obtuso, obscuro. (Tab. iv. fig. 8.)

Chrysalis glabra, recta, subcompressa; suprà carinata, arcuata, utrinquè attenuata, mucrone solitario definita. (Tab. iv. fig. 8; 8 a.)

Imago: Antennæ mediocres, graciles, basi filiformes, apicem versus sensim in clavam, elongato-fusiformem, subcompressam abeuntes.

Palpi brevissimi, articulis inferioribus latis, compressis, capiti adnatis, basilari subelongato, squamis brevissimis æqualibus arctè vestito; articulo secundo paululum breviore, extùs rotundato, undique squamulis minutissimis villis interspersis densè obtecto; tertio minuto, attenuato, nudo, porrecto.

Proboscis elongatus, validiusculus.

Caput breve, nutans, alarum arcu costali subreconditum; posticè thoracis cristâ transversâ marginatum.

natum. *Oculi* mediocres, nudi. *Thorax* dilatior; anticè et ad latera cristâ subarcuatâ, ex pilis erectis sericeis ornatus. (*Abdomen* elongatum, gracile, in maribus sex-articulatum, articulo ultimo duobus uncis approximantibus; valvis latis, incrassatis, truncatis, aduncis. *Swains.*) *Alæ* largæ; anticæ oblongæ, obtusæ, margine costali thoracem versus fortiter arcuato; posticæ latæ, rotundatæ, sulco abdomen excipiendo pallescente: areolâ discoidali singularum clausâ. *Pedes* graciles, elongati: antici in utroque sexu conformes; tarsi singulorum quinque-articulati; articulo basilari elongato, reliquis subæqualibus, ultimo unguibus duobus minimis, bifidis et pulvillo intermedio instructo.

This genus was first established with great judgment by Mr. Swainson, in the fourth number of his Zoological Illustrations; and I am very happy to be enabled to add to the character there limited from the perfect insect, a complete representation of the metamorphosis of *Terias Hecabe,* the species which is adduced as the type of the genus, and to illustrate it by a careful dissection. See Plate iv. fig. 8; 8, a; 8, b; 8, c; 8, d; 8, e; 8, f. It is here placed between *Colias* and *Pontia;* and an inspection of the plate will show that this is its natural situation. *Terias* resembles *Colias* in the form of the chrysalis and in several properties of the perfect insect, particularly the structure of the palpi, and the form and painting of the wings; the larva, on the contrary, and the antennæ, have a much nearer relation to *Pontia.* I must however state, that these remarks apply exclusively to the Oriental group of which *T. Hecabe* is the type: the American species I am unacquainted with, and they appear to possess some peculiarities. Of the genus *Terias* as above defined, we have five species from Java: they greatly resemble each other in colour, painting, and external character, but I trust the following details will sufficiently elucidate their specific peculiarities.

60. Terias Hecabe. *Alæ suprà lætissimè flavæ, limbo communi postico nigro, in anticis lato costam versus arcuato attenuato, juxta marginem interiorem transversim definito, in area mediana sinu recto profundo exciso; in posticis angustiore margini prorsus parallelo, intùs denticulato; fimbriâ communi flavescente: subtùs flavæ; singulis notâ discoidali fuscâ annulato-ovatâ irregulari subgeminâ; anticæ insuper ad basin notis duabus minutis, exteriore subangulari; posticæ notis minutis tribus subannulatis basilaribus fuscis, fasciâque arcuatâ marginali latè interruptâ ex notis subflexuosis conflatâ:* fœmina *fasciâ anticarum accessoriâ insigni dimidiatâ apicali violaceo-fuscâ a mare manifestè discrepat.* (Exp. alar. unc. 1½—2.)

Wings above bright yellow, with a common posterior border of a black colour, which is very broad in the fore-wings, passes in an arch towards the middle of the costa, is abruptly transverse near the interior margin, the middle being deeply excavated in the direction of the nervures and marked with a medial tooth, pointing towards the disk; in the hinder-wings the border is narrow, parallel with the margin and denticulated at its inner edge; all the wings are confined by a common extreme yellowish marginal thread: underneath yellow; each pair on the disk with a brown annular-ovate irregular mark, transversely divided in the middle; fore-wings bearing besides, near the base, two minute marks, of which the exterior is angular, hinder-wings with several brown delicate sub-annular characters at the base, and a very obsolete series of widely interrupted clouded or sub-flexuose spots passing at a small distance from the posterior margin in an irregular arch across the disk.

Plate I. fig. 12. (The female). Plate IV. fig. 8; 8, a. The larva and chrysalis.

Papilio

Papilio D. C. Hecabe. Linn. Syst. Nat. 2. p. 763. No. 96. Fab. Spec. Ins. tom. 2. p. 42. No. 178. Cram. pl. 124. fig. B. C. Sulz. Ins. edit. Roem. tab. 15. fig. 7.
Pieris Hecabe. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. p. 134. (In Mus. D. Banks.)

This is one of the most common diurnal Lepidoptera, having a wide range through intratropical Asia and the Eastern Islands. We have specimens from various parts of India. Those from Java were chiefly obtained by breeding and are in high perfection. The larva feeds on the *Æschynomene Sesban*, and is found abundantly from January to April. The specimens, in whatever country collected, agree closely in their markings, and present no varieties: the distinctive mark of the female, as above indicated, is, as far as my observation extends, permanent, and it is confirmed by the habit of the body. One of the varieties indicated by the authors of the Encyclopédie is described in the sequel as a distinct species.

61. Terias Sari. *Alæ suprà sulphureæ, limbo communi postico nigro, in anticis ad apicem largissimo ultra medium costæ arcuatim attenuato, ad marginem interiorem rectè transverso, in area mediana sinu simplici profundo exciso extùs obliquè intùs rectè definito; limbo posticarum discum versus evanescente: subtùs lætè sulphureæ, singulis notâ discoidali lineari-annulatâ subsimplici; anticæ plagâ apicali maximâ quadratâ violaceo-fuscâ, maculâ oblongâ obliquâ nigricante intra angulum apicalem interiorem versusque basin signo tenui solitario flexuoso; posticæ notis duabus sub-obsoletis basilaribus, maculâ obscurâ fusco-irroratâ ad medium costæ ordineque macularum obsoletarum intra marginem posticum.* (Exp. alar. 1 unc. 9 lin.)

Wings above sulphureous, with a common posterior black border, which in the fore-wings is very broad at the apex, whence it passes in a gradual curve beyond the middle of the costa; at the interior margin it is regularly transverse, and in the medial area it is excavated by a deep notch having an oblique flexuose exterior, and a regular longitudinal inner edge; in the hinder-wings the border is parallel with the posterior margin, having its inner edge gradually evanescent: underneath bright sulphureous, each wing bearing a simple linear-annulated mark on the disk; fore-wings with a large quadrangular violaceous-brown spot at the apex, a smaller oblique blackish mark near the inner apical angle, and a delicate flexuose character of the same colour, near the base; hinder-wings with two obsolete sub-annular basal characters, an obscure brownish cloud near the middle of the costa, and a very obsolete series of clouded wedge-shaped marks within the posterior margin.

This insect is distinctly indicated in the Encyclopédie. In that work it is considered as a variety of *Terias Hecabe.* But it appears from the preceding remarks, that in an extensive series of more than forty specimens of the latter insect, no variation is observed but that arising from the distinction of the sexes. I therefore consider the indication alluded to as a confirmation of our species: according to my research it is clearly distinguished from *T. Hecabe*, by the breadth and interior outline of the posterior border of the fore-wings above, as well as by the large quadrangular apical spot and the peculiarity of the markings underneath. Our collection contains a single specimen in high perfection.

62. Terias Tilaha. *Alæ suprà sulphureæ, anticæ limbo posteriore ad apicem largissimo intùs subæqualiter sinuato obliquo, e medio costæ versus angulum apicalem interiorem extenso, limboque interiore lato margini parallelo nigricanti-fuscis; posticæ limbo apicali, intùs obsoletè dentato evanescente ejusdem coloris: subtùs pallidè sulphureæ; singulæ notâ discoidali lineari-annulatâ*

annulatâ characteribusque paucis basilaribus obsoletissimis fuscis; anticæ margine interiore pallidè nigricante limbatæ. (Exp. alar. 1 unc. 10 lin.)

Wings above sulphureous; fore-wings having the posterior border of a black colour, very broad at the apex, with a nearly regularly sinuated inner edge, extending obliquely from the middle of the costa towards the inner apical angle; a regular border along the inner margin being of the same tint; hinder wings with the posterior border obsoletely dentated within and subevanescent, also blackish brown: underneath pale sulphureous; each wing with a linear-annulated mark on the disk, and a few very obsolete characters near the base brown; fore-wings having the interior margin bordered with a blackish stripe.

Manifestè discrepat hæc species a præcedente limbi apicalis margine interiore subregulariter sinuato fasciâque nigricanti-fuscâ marginem interiorem legente. Notæ paginæ inferioris discoidales et basilares illis speciei præcedentis apprimè conveniunt; alæ tamen pallidiores sunt et marginem posticum versus immaculatæ; in imo margine series interrupta punctorum minutorum nigrorum et in anticis, intra angulum apicalem exteriorem, striga obsoleta notarum fuscarum.

63. Terias Harina. *Alæ suprà pallidè sulphureæ, limbo apicali communi nigricante, in posticis obsoletissimo, ante medium marginis desinente, in anticis saturatiore ad apicem latiore leviterque sinuato: subtùs immaculatæ flavido-nitentes basin marginemque versus saturatiores.* (Exp. alar. 1 unc. 9 lin.)

Wings above pale sulphureous with a common posterior border of a blackish colour, which in the hinder pair is very faint and not continued beyond the middle of the margin, while in the fore-wings it has a deeper tint, and is slightly notched near the apex: underneath pure yellow, somewhat shining, more deeply tinctured at the base and apex, and entirely immaculate.

Differt hæc species a *Pieride Licinia* Fabricii cui simillima, alis suprà sulphureis, subtùs omnibus immaculatis, corporeque flavido.

Alæ posticæ canali abdominali albido: antennæ fuscæ extùs crebrè albido-crenulatæ. *Thorax* flavidum villis sericeis subcanescentibus ornatum; *abdomen* albidum. Subtùs tota immaculata, flavido læto nitens. Exemplar unicum, attamen perfectissimum, in Musæo nostro hospitatur.

64. Terias Drona. *Alæ suprâ lætè flavæ, basi atomis fuscis irroratæ, limbo communi postico nigricanti-fusco, e violaceo subnitente, intùs argutè et æqualiter sinuato, anticarum dilatiore posticarum versus marginem interiorem attenuato; singulæ cinereo-flavido fimbriatæ: subtùs flavæ, anticæ notâ solitariâ transversâ tenui discoidali, posticæ notâ lineari-annulatâ discoidali, punctis circiter tribus basilaribus sparsis fuscis, serie denique intramarginali ex maculis difformibus oblongis et cuneatis fusco-pulverulentis.* (Exp. alar. lin. 18—21.)

Plate I, fig. 13.

Wings above bright yellow, irrorated with minute brown dots at the base, with a common blackish brown, slightly violaceous and shining posterior border, equally and acutely sinuated at the inner edge, broader in the fore-wings, gradually attenuated in the hinder pair towards the inner margin, near which it disappears; the fringe of all the wings being pale cinerous yellow: underneath yellow; fore-wings with a delicate solitary transverse discoidal mark,

 hinder

hinder pair with a linear annulated mark on the disk, about three minute scattered dots near the base, all of a brown colour; finally within the posterior margin an irregular series of oblong and wedge-shaped clouds of delicate brown irrorations.

Terias Drona nostra *Papilioni Smilaci,* insecto Novæ Hollandiæ a Dom. E. Donovan depicto, valde similis est, differt tamen alis posticis ad paginam superiorem limbo apicali distincto et sinuato, etiamque notarum inferiorum numero, colore ac distributione. Exemplaria tria in Musæo asservantur.

Genus PONTIA.

Pontia. *Fab. Ochsenh. Curtis, Stephens, &c.* Pieris. *Latr. Schrank.* Papilionis—Danaorum candidorum species. *Linn.* Papiliones: Danai candidi. Fam. D. Larvæ mediostriatæ. *Wiener Verzeichnis,* 162. Whites. *Haworth.*

Character. *Larva* lineari-cylindrica, gracilis, utrinquè vix subattenuata, pilosiuscula, strigis ornata longitudinalibus, lætioribus obscurioribusque alternantibus, strigâ dorsali insigniore; segmentis obsoletis; capite parvo, rotundo.

Chrysalis glabra, angulata, anticè mucrone solitario, breviusculo vel elongato munita, modò lævis, modò tuberculata, dorso carinato; tuberculo anteriore pectorali solitario, breviusculo; lateralibus utrinquè patentibus, insignioribus ; posticè adnexa, filoque mediano erectè ferè suspensa.

Imago : Antennæ mediocres vel rariùs subelongatæ, e basi ultra medium filiformes, clavâ obconicâ, obtusâ, subcompressâ vel subfusiformi definitæ.

Palpi subcylindricæ; breves vel mediocres; parallelè porrecti vel subdivergentes; articulis inferioribus suprà squamis minutis tecti, subtùs pilis setosis, laxis, diffuso-patentibus, alternatim longis brevibusque, subfasciculatis vestiti; articulo basilari robustiore, elongato, posticè arcuato, capiti adpresso, ultra medium soluto; articulo secundo mediocri, oblongo vel ovato, porrecto, subassurgente; articulo tertio magnitudine et formâ valde variabili; nunc gracili, attenuato, secundum longitudine superante, modò orbiculato, minimo, obtuso, squamis teneris pilis interspersis vestito.

Proboscis longus, gracilis.

Caput breve. *Oculi* mediocres, nudi. *Corpus : thorace* subdilatato-convexo, anticè et ad latera, fasciculis pilorum ornato; *abdomine* gracili, subelongato, posticè in mare sæpiùs penicillato. *Alæ anticæ* oblongæ, breves, margine postico recto, vel subelongatæ, apicem versus attenuatæ, in angulum productæ, margine postico obliquo: *posticæ* obtusæ, rotundatæ, rariùs angulum analem versus subattenuatæ. *Pedes* graciles, elongati; antici in utroque sexu conformes; tarsi singulorum quinque-articulati; articulo basilari elongato, sequentibus subæqualibus, ultimo unguibus duobus, brevibus, lateralibus, bifidis, pulvillo intermedio appendiculisque exterioribus munito.

The extensive genus above described, with *Colias* and *Terias* which precede, and *Pieris* which follows, as well as the genera *Gonepteryx* of Leach, and *Leucophasia* of Stephens, were all originally included in a single subdivision of the genus *Papilio* of Linnæus. The paleness of tint by which the individuals of this group are generally characterized, suggested the designation of *Danai Candidi,* to which the name of *Whites* has been accommodated in the English nomenclature. From this group, which at the time of its limitation was tolerably natural, the genus *Colias* was separated as early as the year 1776, by the acute authors of the *Wiener Verzeichnis.* They were led to this judicious separation by their extensive researches regarding the metamorphosis

metamorphosis of Lepidoptera, in which they noticed the peculiarities that distinguish this group from the *Whites.* The name of *Danai flavi,* in our nomenclature *clouded Yellows,* was accordingly assigned to the family of *Pallidiventres (Seitenstreifraupen),* which, as has been shown in the introduction, p. 14, is the representative of the genus *Colias.* As science advanced, further subdivisions became necessary. Mr. Swainson noticed the peculiarities of the *Papilio Hecabe* of Linnæus, and from it and its associates defined the genus *Terias:* and both Mr. Curtis and Mr. Stephens agree in confirming the distinctness of the genus *Leucophasia,* of which *Pontia Sinapis* is the type. The observations which will be made in the sequel, will clearly show the ground on which the genus *Pieris* rests. After all these subdivisions, the genus *Pontia,* as now defined, does not consist of an assemblage of uniform species; in the limited Indian series contained in our collection, *five* distinct types of form are comprised, on which as many sectional distinctions are founded. The characters of the sections are chiefly derived from the modifications of the antennæ, palpi and outline of the wings. The metamorphosis, as far as its more minute modifications have hitherto been discovered, has also been consulted; and the pupa affords a very clear discrimination, in two of the sections. The peculiarities of the nervures of the wings confirm, as far as I have yet observed, the subdivisions now proposed, but I have not been enabled to follow this character into more minute variations, by a comparison of all the species in our own collection, which thus remains for a future enterprize. Each of the sections is designated by a proper name derived from the typical species, which will provisionally characterize the group as a patronymic, until the further accumulation of species shall indicate the necessity of raising the sections to the rank of subgenera.

* *Palpi capite breviores, clypeo penicillato reconditi; articulo basilari longissimo, secundo mediocri, orbiculato, tertio ovato, minutissimo. Antennæ graciles, elongatæ, clavâ tenui, subfusiformi. Alæ anticæ apice subrotundato.* VALERIA.

65. PONTIA VALERIA. *Alæ suprà virescenti vel cærulescenti-albidæ,* maris *limbo communi postico, costali anticarum venisque nigris;* fœminæ *limbis latioribus ad discum extensis, in ferrugineum vergentibus, venis dilatatis serieque posticâ communi punctorum, interiore macularum oblongarum albarum: subtùs maris lacteæ glaucino-nitentes nervis obscuris nigris, limbo obsoletissimè fusco-irrorato;* fœminæ *canescenti-fuscæ nitore violaceo; anticæ basi saturatiore, posticæ cinerascenti-flavæ, singulis punctis maculisque paginæ superioris notatæ venisque latioribus.* (Exp. alar. unc. 2—3.)

Wings above, in the male, greenish or bluish white, with a common posterior border, the costal border of the fore wings and the nervures of a black colour; in the female grayish white or yellowish, with broader borders along the margins generally, which spread to the disk and assume a blackish-brown tint, the nervures being throughout more diffuse; this sex bears near the hinder margin and parallel with it a regular series of white dots, extending through both pair, and within the same, tending towards the disk, a less regular series of oblong longitudinal spots of different sizes, of the same colour: underneath the wings are cream-coloured with a glaucous gloss in the male, and marked with delicate black nervures, while the posterior border of the fore-wings appears only in a strong light, the wings bearing towards the margin at the nervures clouds of obsolete brownish irrorations; in the female the wings are grayish brown with a faint violet lustre; the fore-wings having a more saturated tint near the base, the hinder being grayish yellow, while in all the wings the nervures are broader and the dots and spots of the upper surface are distinctly apparent.

Papilio Valeria. Cram. pl. 85. fig. A. (Variety of the male.)
Pieris Valeria. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 154.

Our collection contains four male and four female specimens from Java. We have also several continental specimens, in which, however, the sexual distinction is less apparent. The latter possess that peculiarity assigned to this species in the description given of it in the Encyclopédie, having a series of white dots in the marginal border of the fore-wings, while our description represents the insect agreeing strictly with Cramer's figure, which is considered as a variety by MM. Latr. and Godt., having in the male a simple posterior border in all the wings. Our insect possesses another peculiarity, the colour inclining more to bluish than to greenish-white. The remarkable difference in the painting of the sexes is also to be considered in the description of our species. In the female the border is undefined spreading over the entire disk, and even to the base, while the intermediate white patches are slightly covered with brown irrorations, over which, towards the base, a saturated yellowish or grayish shade is thickly spread. Indeed the female assumes the external habit of an *Euplœa;* but in the modifications of the nervures it closely agrees with the male. Bearing in mind these peculiarities of the Javanese insect, it remains for future inquiries to determine whether it be not specifically distinct from the continental species.

** *Palpi capite longiores, articulis exterioribus subæqualibus, ultimo gracili, attenuato. Antennæ elongatæ, clavâ subfusiformi, acutâ. Alæ breves; anticæ orbiculato-rotundatæ.* Nina.

66. Pontia Nina. *Alæ niveæ teneræ nitidæ; anticæ utrinquè maculâ maximâ medianâ ante discum sitâ subangulatâ apiceque paginæ superioris obliquo nigricanti-fuscis; posticæ immaculatæ: subtùs anticæ margine costali basi apiceque glaucino-cinereo irroratæ; posticæ paginâ totâ cinereo-viridi nebulosæ, strigis tribus undulatis distinctioribus.* (Exp. alar. lin. 16—19.)

Wings snow-white, somewhat glossy and of a delicate texture, anterior having on both sides a large subangular mark in the medial area a little behind the disk, with the obliquely defined apex of the upper surface blackish brown; hinder-wings immaculate: underneath fore-wings with the costal margin as well as the apex and base irrorated with ash-gray; hinder-wings having the whole surface delicately variegated with the same tint, slightly verging to green; three more distinct undulated strigæ passing at regular distances parallel with the posterior margin across the whole surface.

Papilio D. C. Xiphia. Fab. Spec. Ins. tom. 2. p. 43. No. 180. —— Mant. Ins. tom. 2. p. 20. No. 204. Hospitatur Musæo Domini Banks, a Fabricio ipso sic inscripta.
Papilio D. C. Nina. Fab. Ent. Syst. em. tom. 3 pars 1. p. 194. No. 604.
Pieris Nina. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 162.

Hæc species a *Papilione Alcesta* Crameri nisi cautâ comparatione distingui non potest: differt tamen alis omnibus brevioribus magis abruptè rotundatis; ut et notis sequentibus: anticarum nempe maculâ discoidali obscurè fuscâ, nitore hyalino prorsus carente; posticarum paginâ totâ cinereo nebulosa in virescentem vergente strigisque tribus distinctioribus undulatâ.

A specimen of this insect, preserved in the Banksian cabinet at the Linnean Society, is marked with a ticket bearing the name of *Papilio Xiphia* in Fabricius' own handwriting. It also appears with this name both in the Species Insectorum and in the Mantissa, but in the Entomologia Systematica Emmendata published at a period subsequent to those works, we find the name of *Nina* applied to this insect, in order to prevent a "*double emploi*" of one name in the genus *Papilio*, *Xiphia* having previously been given to one of the Nymphales.

The specimen in the Banksian collection agrees closely with those I brought from Java, where it is by no means unfrequent. Our insect may easily be confounded with the *Papilio Alcesta* of Cramer, from the Coast of Guinea, to which the name of *Narica* is applied both by Fabricius and the authors of the Encyclopédie. I have endeavoured in a preceding note to point out the distinction.

*** *Palpi articulo ultimo subabbreviato. Antennæ breves; clavâ ovatâ, obtusâ, compressâ. Alæ anticæ rotundatæ. Chrysalis antrorsum longè-attenuata, medio arcuata, absque appendiculis lateralibus.* MANCIPIUM.

67. PONTIA AMATA. *Alæ suprà dilutè testaceæ, basi saturatiore ex colore lateritio fulvescente, limbo nigricanti-fusco, punctorum duplici serie: subtùs virescentes, puncto ocellari medio.* (Exp. alar. lin. 17—20).

Wings above pale testaceous, assuming a reddish brickdust slightly fulvescent tint at the base, with a blackish brown border bearing a double series of dots of the ground colour: underneath greenish yellow with a black discoidal dot.

Papilio D. C. Amata. Fab. Ent. Syst. Em. tom. 3. pars 1. p. 202. No. 633. (The male.)
Pap. D. C. Cipræa. Fab. Ent. Syst. Em. tom. 3. p. 203. No. 634. (The female.)
Papilio Calais. Cram. pl. 53. fig. C. D. Pl. 351. A. B. fig. C. D. (Variety of the female.) Mus. Dom. Banks.
Pieris Amata. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 131.

Ten specimens from various parts of Continental India are contained in our collection.

68. PONTIA DANAE. *Alæ utrinquè albæ; anticæ parte dimidiâ posticâ obliquâ nigrâ, ad apicem latè chermesinâ, in fœmina serie insuper transversâ punctorum; posticæ limbo continuo vel interrupto nigro: subtùs anticæ apicem versus fulvescentes, tæniâ arcuatâ dimidiatâ saturatiore punctis quadratis seriatis nigricantibus fretâ; utrinquè ad discum puncto nigro; posticæ strigâ postmedianâ moniliformi punctoque discoidali fulvis nigro-irroratis.* (Exp. alar. 1 unc. 9 lin—2 unc.)

Wings white on both sides; anterior having the extreme dimidial portion, separated by an oblique boundary line black, the apex being covered with a broad crimson patch defined according to the outline of the wing, which in the female bears a transverse row of black dots; hinder pair with a continued or interrupted posterior border of a black colour: underneath fore-wings fulvescent towards the apex, with a more saturated curved dimidial band, bearing a series of quadrangular blackish dots; and a round discoidal spot on both surfaces; hinder pair with a regular row of dots beyond the middle, and a spot on the disk of a fulvous colour irrorated with black.

Papilio D. C. Danae. Fab. Mant. Ins. tom. 2. p. 22. No. 233. Mus. Dom. Banks.
Papilio Danae. Donov. Ind. Ins. (With a figure.)
Papilio Eborea. Cram. pl. 352. fig. C. D. E. F.
Pieris Danae. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. p. 124.

We have four specimens of this insect.

69. PONTIA TITEA. *Alæ albæ; anticæ* maris *suprà apice fulvæ, margine crenulato punctoque postico nigris;* fœminæ *apice dilutiores, fasciâ arcuatâ costali punctoque discoidali nigris; posticæ serie maculari marginali nigrâ in fœmina insigniore: subtùs anticæ basi sulphureæ apice fulvescentes strigâ costali arcuatâ nigrâ in fœmina saturatiore; posticæ* maris *fasciâ pone*

pone medium interruptâ obsoletissimâ fuscâ; fœminæ *paginâ totâ fulvo-griseo-margaritaceoque nebulosæ fasciâ medianâ ferrugineâ insigniore.* (Exp. alar. lin. 18—21.)

Wings white; anterior in the male above with a fulvous tip, the crenulated margin of which and a posterior dot being black; in the female, apex pale inclining to fulvescent, and marked with a curved band, which as well as a dot on the disk is also black; hinder pair with a macular band of the same colour, which is more distinct in the female: underneath fore-wings sulphureous at the base and fulvescent at the tip, with an arcuated black costal striga, which is more saturated in the female; hinder pair in the male with a very obsolete interrupted brown band beyond the middle, while in the female the entire surface is clouded with delicate fulvous, gray, and pearly marks, a more saturated ferruginous band consisting of two interrupted portions occupying the middle of the surface.

Papilio Aurora. Cram. pl. 299. fig. A. B. C. D.

Pieris Titea. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. p. 124.

We have specimens of both sexes, collected chiefly in the neighbourhood of Madras. Query: should this species be united with the *P. Eucharis* of Fabricius? A specimen of the latter in the Banksian Museum possesses no obvious distinction.

**** *Palpi articulo terminali gracili, attenuato, secundo longitudine insigniore. Antennæ subabbreviatæ, clavâ elongato-ovatâ, obtusâ. Alæ anticæ oblongæ, apice obtusè angulato, margine posteriore recto. Chrysalis processu antico distincto, appendiculis lateralibus prominulis, acutis, patentibus.* PONTIA.

70. PONTIA MESENTINA. *Alæ albæ,* (fœminæ *basin versus flavescente lavatæ), limbo postico communi nigro albo-maculato; anticæ utrinquè fasciâ costali incurvâ nigrâ: subtùs posticæ flavæ fusco venosæ.* Enc. Méth. (Exp. alar. unc. $2\frac{1}{8}$—$2\frac{3}{8}$.

Wings white, (in the female with a yellow tint spreading to the base), the posterior border in both pairs black spotted with white; anterior marked on both sides with a short arched costal band; underneath hinder pair yellow, with strongly pronounced brown nervures.

Papilio D. C. Aurota. Fab. Ent. Syst. Em. tom. 3. pars 1. p. 197. No. 614.

Papilio Mesentina. Cram. pl. 270. A. B. (The male.)

Pieris Mesentina. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. p. 130.

The metamorphosis of this species was observed by Maj. Gen. Thomas Hardwicke, who, with his accustomed liberality, communicated to me an excellent drawing of the insect in all its states. The larva is long, slender, slightly attenuated at each end, and longitudinally marked with bands of different colours. Along the middle of the body is on each side a yellow, and beneath this a black abdominal band: the band along the back is green. The whole surface of the larva is covered with delicate whitish hairs. In other respects it agrees with the character given in the generic description; and the pupa exhibits in great perfection the peculiarities which belong to this section.

This insect was not found in Java. Numerous specimens have been sent to our museum from the coast of Coromandel.

71. PONTIA MARIANNE. *Alæ suprà cœrulescenti seu flavescenti-albæ; anticæ apice (medio fulvo) nigræ: subtùs singulæ flavidæ, puncto ocellari medio strigâque moniliformi posticâ.* Ent. Méth. (Exp. alar. unc. $2\frac{1}{4}$.)

Wings above bluish or yellowish white; fore-wings with a black apex, which is covered to within a small

a small distance of the margins with a fulvous patch: underneath all the wings yellowish, bearing in the middle a solitary and towards the posterior margin a continued regular series of ocellate dots.

Papilio Marianne. Cram. pl. 217. fig. C. D. E.
Papilio D. C. Sesia. Fab. Spec. Ins. tom. 2. p. 47. No. 206. ?
Pieris Marianne. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. 120.

Several male specimens, imperfectly preserved, have been sent to our museum from the Coromandel Coast. Donovan gives a figure representing the upper surface of *P. Sesia.*

72. Pontia Ænippe. *Alæ flavæ; anticæ suprà apice latè nigro fasciâ flavâ seu fulvâ: subtùs singulæ punctis ocellaribus serie posticâ digestis, punctoque discoidali anticarum nervo transversali intersecto.* (Exp. alar. unc. 2. lin. 2—4.)

Wings yellow; the anterior above with a broad black apex marked with a yellow or fulvous band: underneath a posterior series of ocellate dots passes through all the wings, while the fore-wings have besides a dot on the disk, which is intersected by the transverse nervure.

Papilio D. C. Ænippe. Fab. Spec. Ins. tom. 2. p. 48. No. 207.
Papilio Ænippe. Cram. pl. 105. fig. C. D. pl. 157. fig. C. D. pl. 229. B.C. (A variety.)
Pieris Ænippe. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. p. 120.

This insect was not observed in Java, but various specimens from Continental India are contained in our museum, among which is a variety resembling in its upper surface the insect figured on Cramer's 229th plate. Although the peculiarities of our 71st, 72d and 73d species are detailed with considerable perspicuity in the Encyclopédie, their discrimination requires some attention, in consequence of their resemblancc in habit and painting. Having examined the specimen of *Pap. D. C. Sesia* of Fabricius contained in the Banksian Cabinet, I have been induced to annex the synonym of that insect to the *P. Marianne* of Cramer; and from a similar examination of the *P. Rhexia,* I have to state, that I cannot discover any difference between that insect and *P. Pirene* as described in the Enc. Méth.

73. Pontia Pirene. *Alæ flavæ; anticæ suprà apice (medio fulvo) nigræ: subtùs singulæ puncto medio fusco.* Enc. Méth. (Exp. alar. unc. 2¼)

Wings yellow; the anterior above with a black apex, bearing in the middle a fulvous patch: underneath all the wings have a brown dot on the disk.

Papilio D. C. Pyrene. Linn. Syst. Nat. 2. p. 762. No. 86.
Papilio Pyrene. Cram. pl. 125. A. B. C.
Pieris Pirene. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. p. 120.

Our specimens, two in number, are from Continental India.

74. Pontia Venilia. *Alæ flavæ; anticæ suprà plagâ medianâ fulvâ, margine punctoque discoidali nigris;* fœminæ *plagâ fulvâ ampliore, serie insuper posticâ macularum flavarum cuneatarum; basi cinereo-irroratâ; posticæ limbo posteriore nigro: subtùs singulæ puncto centrali nigro:* fœminæ *in posticis serie postmedianâ maculari fuscâ cinereo-irroratâ.* (Exp. alar. unc. 2¼.)

Wings yellow; anterior pair above with a large medial fulvous patch, the border and a discoidal spot being black; in the female the fulvous patch is more extensive, and spreads towards the base, which is irrorated with gray, and the posterior margin bears a series of yellow wedge-shaped spots; hinder wings in both sexes with black posterior border: underneath all the wings

wings are marked with a black dot in the middle; the female having in the hinder pair a widely interrupted macular band of a brown colour irrorated with gray.

Pieris Venilia. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. p. 121.

The great similarity of the species last enumerated has already been pointed out: they are however clearly discriminated in the preceding description, in which I have followed the authors of the Encyclopédie, but not without subjecting each to a close examination. *Pieris Venilia* is first described in the work just cited; it appears to be, in Java, the representative of the three former. Our collection contains a single pair in perfect preservation.

75. Pontia Judith. *Alæ subconcolores; anticæ albæ, venis limboque nigris; posticæ flavæ, limbo nigro, angulum analem versus aurantiacæ.* (Exp. alar. unc. $1\frac{3}{4}$—$2\frac{1}{8}$.)

Wings agreeing in colour on both sides; anterior white with black nervures and posterior border; hinder pair yellow, with black border; the anal angle and its immediate confines having a more saturated orange tint.

Papilio D. C. Judith. Fab. Mant. Ins. tom. 2. p. 22. No. 230.
Papilio Judith. Donov. Ind. Ins. (With a figure.) Mus. Dom. Banks.
Pieris Judith. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. p. 121.

This is, in Java, one of the most abundant species of *Pieris.* The specimens in our collection are numerous, diversified as to size, but agreeing in colouring and markings.

76. Pontia Coronis. *Alæ suprà albæ, limbo postico communi nigro, anticarum dilatiore albo-maculato venisque distinctioribus: subtùs virescenti-griseæ venis latioribus subconfluentibus fasciâque posticâ fuscis, ferrugineo vel griseo-irroratis pulverulentis; posticæ maculâ basali ad costam attenuatâ triangulari insigni saturatissimâ fulvo-pulverulentâ* (Exp. alar. 1 unc. 10 lin.—2 unc. 3 lin.)

Wings white above, with a common posterior black border, which is broader in the fore-wings and spotted with white, the nervures also in these being more pronounced: underneath greenish-gray with broader spreading subconfluent nervures covered with opaque ferruginous irrorations, and a posterior band of a brown colour; hinder wings at the base with a deep-fulvous triangular mark extending attenuated along the costa, its covering being opaque and pulverulent.

Plate IV, fig. 9; 9; a. The Larva and Chrysalis,

Papilio D. C. Coronnis. Fab. Spec. Ins. tom. 2 p. 45. No. 193.
Papilio Coronis. Cram. pl. 44. fig. B. C.
Pieris Coronis. MM. Latr. et Godt. Enc. Méth. Hist. Nat. ix. p. 132.

The metamorphosis of this species is distinctly represented on our fourth plate. In the chrysalis an excellent illustration of this organ, as modified in the present section, is afforded. Our specimens, many of which were obtained by breeding, are numerous; they exhibit no variation in the markings, and but little in their colouring; in a few individuals the posterior wings have underneath a grayish tint, and the basal mark is obscure and whitish, but in no single instance have the wings a yellow tint. In the species next following, the whole surface of the hinder wings underneath is covered with an uniform bright yellow colour, and the triangular basal mark, which is so prominent in the *Pieris Coronis,* is entirely wanting; and as our collection contains more than twelve specimens, which all essentially agree among themselves and with Cramer's figures of *P. Evagete,* I have introduced that species with his original denomination. All our specimens are from Continental India.

EXPLANATION OF THE PLATES.

PLATE V.

Fig.

1. ...... Papilio Macareus. *Enc. Méth. Hist. Nat. ix.* 76.

2; 2, a. Neptis Vikasi. H.

3; 3, a. Paphia Periander. Papilio Nymphalis Periander. *Fab.*

4; 4, a. Paphia Franck. Nymphalis Franck. *Enc. Méth. Hist. Nat. ix. Suppl.* 825.

5; 5, a. Aconthea (Gen. Nov. H.) Lubentina (the male). Papilio Nymphalis Lubentina. *Fab.*

6. ...... Aconthea Alankara. H.

7; 7, a. Melanitis Dusara. H.

8; 8, a. Hipparchia Medura. H.

9; 9, a. Hipparchia Makuta. H.

PLATE VI.

1. ...... Idea? Gaura. H.

2. ...... Ariadne (Gen. Nov. H.) Coryta? Papilio Coryta? *Cram. Pl.* 86. fig. E.F.

3; 3, a. Paphia Schreibers. Nymphalis Schreiber. *Enc. Méth. Hist. Nat. ix. Suppl.* 825.

4. ...... Paphia Paralekta. H.

5; 5, a. Morpho Odana. *Enc. Méth. Hist. Nat. ix.* 445.

6. ...... Morpho? Celinde (the female.) *Enc. Méth. Hist. Nat. ix.* 446.

PLATE VII.

1. Vanessa Asterie: larva. 1, a: chrysalis. 1, b: Palpi. 1, c: Antennæ. 1, d: Proboscis. 1, e: Fore leg of the male. 1, f: Fore leg of the female. 1, g: Mid leg. 1, h: Last joint of the tarsus of the mid leg magnified, showing the claws, appendages, &c. 1, i: Appendage separated.
2. Vanessa Laomedia: larva. 2, a: chrysalis.
3. Vanessa Orithya: larva. 3, a: chrysalis.
4. Cynthia Cardui, from Java: larva. 4, a: chrysalis. 4, b: Palpi. 4, c: Antennæ. 4, d: Proboscis. 4, e: Fore leg of the male. 4, f: Fore leg of the female. 4, h: Last joint of the tarsus of the mid leg magnified.
5. Phalanta (Gen. Nov. H.) Argynnis Phalanta. *Enc. Méth.* 259: larva. 5, a: chrysalis. 5, b: Palpi. 5, c: Antennæ. 5, d: Proboscis. 5, e: Fore leg of the male. 5, f: Fore leg of the female. 5, g: Mid leg.
6. Ariadne Coryta? H: larva. 6, a: chrysalis. 6, b: Palpi. 6, c: Antennæ. 6, d: Proboscis. 6, e: Fore leg of the male. 6, f: Fore leg of the female. 6, g: Mid leg. 6, h: Terminal joints of the fore leg of the female magnified.
7. Limenitis Sibilla: larva. 7, a: chrysalis. (According to Roesel.)
8. Neptis? H. (Limenitis *Auct.*) Populi: larva. 8, a: chrysalis. (According to Roesel.)

9. Neptis Aceris ? (from Java) larva. 9, a : chrysalis. 9, b : Palpi. 9, c : Antennæ. 9, d : Proboscis. 9, e : Fore leg of the male. 9, f : Fore leg of the female. 9, h : Last joint of the tarsus of the mid leg magnified.

10. Amathusia Phidippus : larva. 10, a : chrysalis. 10, b : Palpi. 10, c : Antennæ. 10, d : Proboscis. 10, e : Fore leg of the male. 10, f : Fore leg of the female. 10, h : Last joint of the tarsus of the mid leg magnified.

11. Morpho ? Celinde : larva. 11, a : chrysalis. 11, b : Palpi. 11, c : Antennæ. 11, d : Proboscis. 11, e : Fore leg of the male. 11, f : Fore leg of the female. 11, h : Last joint of the tarsus of the mid leg magnified.

PLATE VIII.

1. Papilio dissimilis : larva. 1, a : chrysalis. (From General Thomas Hardwicke's series of Indian Drawings.) 1. b : Palpi. 1, c : Antennæ. 1, d : Proboscis. 1, e : Fore leg.
2. Acræa Violæ : larva. 2, a : chrysalis. (General T. Hardwicke.)
3. Biblis Leucothoë : larva. 3, a : chrysalis. 3, b : Palpi. 3, c : Antennæ. 3, d : Proboscis. 3, e : Fore leg of the male. 3, f : Fore leg of the female. 3, h : Last joint of the tarsus of the mid leg magnified.
4. Biblis Procris : larva. 4, a : chrysalis. 4, b : Palpi. 4, c : Antennæ. 4, d : Proboscis. 4, e : Fore leg of the male. 4, f : Fore leg of the female. 4, h : Last joint of the tarsus of the mid leg magnified.
5. Apatura Iris : larva. (According to Roesel.) 5, a : chrysalis. (According to Standish ; MS. Brit. Mus.) The dissection from Apatura Lasinassa. 5, b : Palpi. 5, c : Antennæ ? 5, d : Proboscis. 5, e : Fore leg of the male. 5, f : Fore leg of the female. 5, h: Last joint of the tarsus of the mid leg magnified.
6. Aconthea primaria. H. : larva. 6, a : chrysalis. 6, b : Palpi. 6, c : Antennæ. 6, d : Proboscis. 6, e : Fore leg of the male. 6, f : Fore leg of the female. 6, h : Last joint of the tarsus of the mid leg magnified.
7. Paphia Athamas : larva. 7, a : chrysalis. 7, b : Palpi. 7, c : Antennæ. 7, d : Proboscis. 7, e : Fore leg of the male. 7, f : Fore leg of the female. 7, g : Mid leg.
8. Melanitis undularis : larva. 8, a : chrysalis. 8, b : Palpi. 8, c : Antennæ. 8, d : Proboscis. 8, e : Fore leg of the male. 8, f : Fore leg of the female. 8, h : Last joint of the tarsus of the mid leg magnified.
9. Hipparchia Leda : larva. 9, a : chrysalis. 9, b : Palpi. 9, c : Antennæ. 9, d : Proboscis. 9, e : Fore leg of the male. 9, f : Fore leg of the female. 9, h : Last joint of the tarsus of the mid leg magnified.

Pl. V

Drawn by J. H. Newton

Engraved by [illegible]

London, Published by Parbury Allen & Co. Leadenhall Street Dec. 1 1828

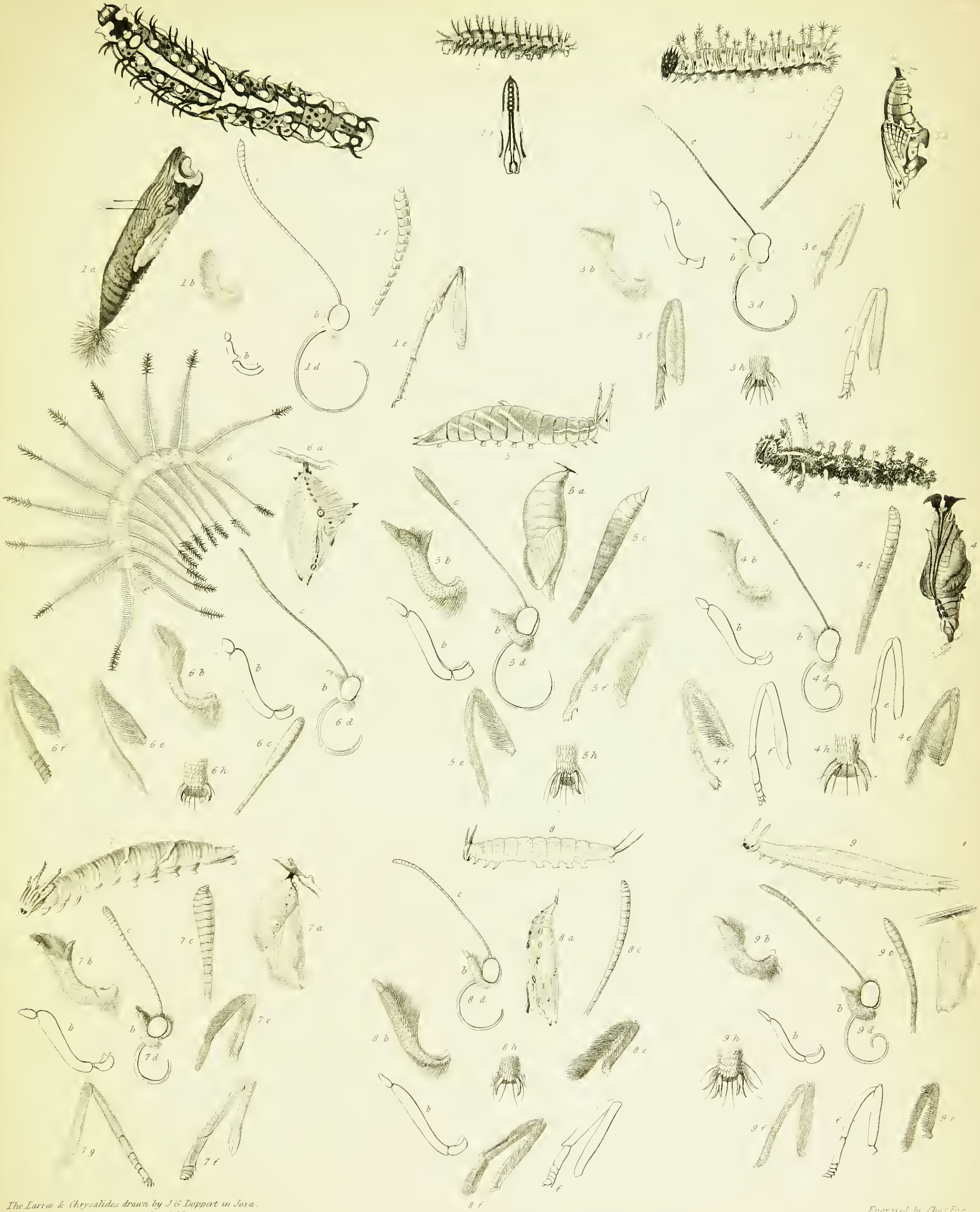
Engrav'd [illegible]

London [illegible] Leadenhall Street [illegible]

The Larvæ & Chrysalides drawn by J. C. D. in Java
The Dissections by C. M. Curtis

Engraved by J. Swaine

London. Published by Parbury, Allen & Co. Leadenhall Street Decr. 1, 1828



The Larvæ & Chrysalides drawn by J. G. Doppert in Java.
The Dissections by C. M. Curtis.

Engraved by Chas Fox

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